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ORIGINAL COMMUNICATIONS.

OCULAR DECOMPRESSION; BEING A CLINICAL CONTRIBUTION TO THE SUBJECT OF CORNEOSCLERAL TREPHINING IN GLAUCOMA.[1]

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In the presence of persisting increased intracranial tension choked disc frequently develops. A technically correct cerebral decompression which releases this increased intracranial tension in many instances is followed by a subsidence of the papilledema and preservation of vision. In the presence of persisting increased intraocular tension the complex disturbance of function and structure called glaucoma develops. A technically correct operation which releases this increased intraocular tension is frequently followed by the subsidence of the glaucomatous symptoms, and preservation of vision is secured. The release of intracranial pressure as the result of a cerebral decompression is not always followed by the disappearance of the disc edema, and vision is not always saved. A technically correct operation which releases the intraocular pressure is not always followed by a subsidence of the glaucomatous symptoms, and sight is not always saved. Increased intracranial pressure is not the whole story of choked disc; neither is increased intraocular pressure the whole story of glaucoma. A certain analogy exists between these operative procedures, each endeavoring in its own way to release from activity the most potent factor which is disturbing cerebral and ocular function on the one hand and ocular function and structure on the other hand.

For years it has been known that if a filtering scar followed the ordinary operation for the relief of glaucoma, namely, iridectomy, the prolongation of the good effects of the operation, provided no other complication arose as the result of this filtering scar, was better than when there was neat and perfect healing of the wound. Therefore it has seemed to many surgeons, notably to Fergus, Elliot and Lagrange, that if a safe filtering area could be produced this much-desired end would be accomplished.

It is my purpose to relate some of my experiences with corneoscleral trephining (often called the Elliot or Fergus-Elliot operation), although the number of operations from which I draw this experience is not great—about thirty. I shall not present a statistical paper, but quote case histories illustrating some of the various types of glaucoma which were submitted to this operative procedure. All of the earlier operations were performed according to the Elliot method, in so far as one may learn an operation from a book description. The more recent operations performed after Colonel Elliot's visit to this country followed, so far as I am aware, exactly his technique, inasmuch as I had the privilege of witnessing a number of his skilful operations. In all instances save one the

[1] A paper read before the Ophthalmic Section of the College of Physicians of Philadelphia.

Stephenson trephine was employed, usually with a 2-mm. opening. Once only the von Hippel instrument was used, which I shall not again utilize for this purpose.

The various types of glaucoma for the relief of which this operation was practiced may be classified as follows: Glaucoma secondary to intraocular hemorrhage; postoperative glaucoma—that is, glaucoma after extraction of cataract; acute glaucoma following obstruction of the angle of the anterior chamber for various reasons; glaucoma in association with the swelling of a cataractous lens; ordinary chronic glaucoma; chronic glaucoma with exacerbations, sometimes called subacute glaucoma, or chronic congestive glaucoma; glaucoma in association with corneal staphyloma; and ordinary absolute glaucoma.

CASE 1.—*Absolute glaucoma from intraocular hemorrhage.* A man, aged seventy-three, reported for examination October 16, 1911, with the history that the left eye had become blind and painful one month prior to this date. The appearances were those of absolute glaucoma, probably due to intraocular hemorrhages, the cornea being steamy and needle-stuck, the pupil fixed, the iris infiltrated, and the surface of the ball covered with injected vessels; tension difficult to determine accurately, but not less than 70 mm. of mercury; no l. p. Right eye, partial cataract, decided angiosclerosis of the retinal vessels; no hemorrhages; vision normal with correcting glass. Systolic blood-pressure 165.

After a week of treatment with dionin, pilocarpine, sodium iodide, and codeia, a very dim fundus view could be obtained. Pain continued to be exceedingly severe. The patient was etherized on the 8th of November, 1911, and Elliot's corneoscleral trephining was performed. The tension immediately dropped to 25 mm. For twenty-four hours the tension remained below normal and the pain was entirely relieved; then high tension returned and the patient insisted upon the removal of the eye. Microscopic examination showed that the trephine opening had been wholly within the sclera, that it was partially plugged with iris tissue and exudate, and that the lens was jammed against the opening. The retina was infiltrated with hemorrhages of long standing.

Comment.—This operation was a failure because it was not technically correct, and therefore the trephine opening accepted the obstruction which I have described. I have, however, observed similar failures in eyes similarly affected in which the operation was apparently technically correct. In his indications for corneoscleral trephining Colonel Elliot refers to blind, painful eyeballs, without describing their pathology, stating that it is a practice in India to trephine in most cases of this class, adding, however, that should trephining fail, or should it in any way be contraindicated, optico-ciliary neurectomy is performed, and that the action of this operation is considered more certain than trephining. One may conclude that he is not enthusiastic in regard to trephining in these circumstances. Personally, I have had more satisfaction from enucleation than from other procedures, but in a number of rather notable instances I have without operation saved eyeballs which ultimately became entirely quiet and painless, largely with the aid of general measures and myosis, aided by drugs which stimulate the lymphagogue activities.

CASE 2.—*Postoperative glaucoma—that is, glaucoma after extraction of cataract.* A boy, aged thirteen, at the time of his first examination, January 10, 1903, had been struck by an exploding giant firecracker two weeks before admission to the hospital; face and cornea peppered with powder grains, which were also present in the iris; pupils irregular and attached to opaque crystalline lenses; moderate cyclitic flush. After a period of treatment both cataracts were removed and the opaque capsule subsequently needled. Ten months later the vision (with suitable correction) of the right eye rose to 6/5 and of the left eye to 6/15, and this vision was maintained, as far as the right eye is concerned, until June, 1910, while the vision of the left eye had improved to 6/10. The patient, who had

up to that time reported regularly, did not appear for a little more than a year, when he came with the statement that for some time he had noticed failure of the vision of the right eye. This was now 6/15, while that of the left eye was 6/9. The disc was

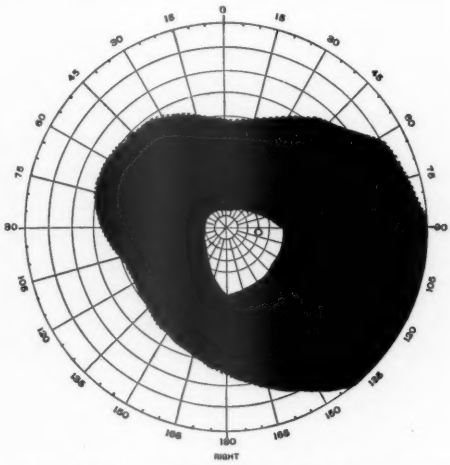

FIG. 1.—Case 2. Visual field of O. D. before corneoscleral trephining.

deeply cupped, and the tonometer registered a tension of 45 mm.; there was marked contraction of the field on the nasal side. The treatment consisted in the use of pilocarpine. The vision slightly improved, and this improvement continued until the 5th of February, 1912, when it dropped to 6/40 and the tension rose to about 45 or 50 mm. The left eye continued to maintain a vision of 6/9.

Elliot's operation was performed on the right eye on the 26th of February, 1912, with excellent effect; the vision rose to 6/25. A few days later an iridectomy was performed on the left eye, as there was some incarceration of the angle of the coloboma in the wound, and not because there was any rise of tension at the time, but in order to prevent this condition of affairs. Healing was perfectly normal. About a month after his dismissal from the hospital, his home being in a distant city, he acquired an acute Neisser infection of the left eye, was treated by a local surgeon accurately, but in spite of the treatment extensive ulceration of the cornea took place and sight was practically lost. The right eye fortunately was uninvolved, and up to the present time (the last examination having been made on the 16th of October, 1914) the vision of 6/25 is maintained and the tension is normal.

The visual field, as may be seen from the accompanying diagrams, has materially increased in size, although the blind area is closer to the fixing point than it was primarily. (Figs. 1 and 2.)

Comment.—Colonel Elliott assumes that if an operation for the relief of glaucoma following cataract extraction shall be successful, the aqueous and vitreous chambers must be shut off from each other, and he doubts the advisability of trephining if there is a free communication between them. If the present instance represents a typical case, and I have knowledge of two or three others that have been equally successful, it would seem that trephining is a

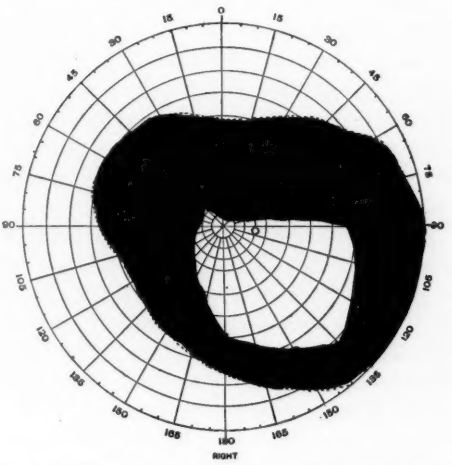

FIG. 2.—Case 2. Visual field of O. D. after corneoscleral trephining.

useful procedure. It is a pity that my endeavor to compare the value of trephining with an iridectomy in the patient whose case history I have just detailed failed on account of the unfortunate Neisser infection which I have described.

CASE 3.—*Glaucoma secondary to cataract —that is, in association with the swelling of a cataractous lens.* A woman, aged fifty-two, reported July 7, 1913. It was not possible to obtain satisfactory history except that vision had been failing for a long time,

and that she had experienced a number of attacks of acute rise of tension in the right eye; finger tension + 3; impossible to use tonometer; cyclitic flush; lens opaque and swollen; faint light perception. Left eye vision 6/15; no cup; no vessel pulsation. Corneoscleral trephining July 8, 1913, associated with a rather large iridectomy, the prolapsed iris having been drawn through the trephine opening; good filtering area; rapid subsidence of the glaucomatous symptoms. The eye became perfectly white and quiet, but some weeks later filtering ceased; tension rose to 60 mm.; reduced with eserine. On September 22, 1913, therefore nearly six weeks after the trephining, the lens was extracted; perfect operative result; twice afterwards rises of tension, always reduced by eserine. At last examination, six months after extraction, tension + ? ; disc quite atrophic and deeply cupped; faint l. p.

Comment.—In the case detailed it is difficult to be sure whether the swelling lens produced the glaucoma, or whether the glaucoma caused the opaque lens. Evidently for a long time the patient was the subject of glaucomatous exacerbations in association with the cataractous lens.

A very interesting observation in this connection was made in the person of an old woman who came with the lens so hazy that the fundus could not be seen, and a tension of 60 mm. No good result followed the use of pilocarpine, eserine, and large doses of salicylate of sodium. Elliot's operation was performed July 11, 1913; large back-shaped filtering area; complete disappearance of congestive symptoms; subsidence of pain. Two months later rise of tension developed without return of congestive symptoms. The eye apparently was quite blind, but it was blind before the trephining; tension now controlled by eserine; media perfectly clear; disc quite atrophic; shallow cup. This seems to me an interesting example of the clearing of what I suppose I may call an edema of the nerve fibers, when the intraocular pressure was released, in spite of the fact that the operation did not achieve a good result primarily in so far as the relief of intraocular tension is concerned—that is, the operative effects had to be reënforced by means of eserine.

I would say from my own experience that in the presence of a swelling cataractous lens with glaucomatous symptoms, the usual iridectomy is a better procedure than trephining, and this agrees with the very much larger experience of Colonel Elliot.

Case 4.—*Acute glaucoma.* A man, aged fifty-eight, was referred by the Genito-Urinary Department because of an inflamed right eye, the vision of which was 6/30; central corneal stippling, with pinpoint infiltrates and moderate injection of the sclera and typical glaucomatous cupping of the disc were evident. Finger tension + 1. Left eye no glaucoma; vision 6/22. Some improvement followed eserine treatment. The patient was admitted to the Surgical Ward of the University Hospital for the treatment of cystitis some months later. While in this ward typical violent acute glaucoma developed. The patient positively refused operation for ten days, during which period of time there was no light perception. Finally consent to operative interference was given, and on the 26th of July, 1912, Elliot's operation was performed. At first the indications were that the result would be disappointing. Gradually, however, the high tension subsided under the influence of dionin, holocain, and pilocarpine, and on the 26th of August he left the hospital. The vision had now improved to the ability to count fingers at six inches, and for a week he had been entirely free from pain, which prior to that time had been intense. There was steady improvement of the eye, and by the 14th of September, or two months after the trephining, the eye was white and quiet, except for the injection of some episcleral vessels; good trephine opening; pupil vertically oval; iris adherent below as the result of the former iridocyclitis; well-marked cupping of the disc; tension normal; vision 6/15; a much contracted visual field, but considering the long blindness, a surprising result.

Comment.—In ordinary primary acute

glaucoma, or, as he calls it, acute congestive glaucoma, Colonel Elliot is satisfied that corneoscleral trephining is at once the safest and easiest method of dealing with the complication. My own experience is too limited to make extended comment, and I simply quote this case as an interesting example of an acute glaucomatous process, lighted up, however, in an eye with chronic glaucoma and therefore not an acute primary glaucoma, although the conditions are practically the same. The result was startlingly good. I cannot, however, agree with Colonel Elliot that trephining in the presence of acute glaucoma is the easiest method of dealing with the complication; even in the presence of a very shallow anterior chamber, with a thin Graefe cataract knife, it is not difficult to operate, and the experience of the majority of operators is in favor of iridectomy in this disease.

Ordinary Chronic Glaucoma. — Under this caption I speak of chronic glaucoma as a disease unassociated with subacute attacks, or with any external manifestations of congestive symptoms, and desire to refer to these types: (*a*) Chronic glaucoma where a technically correct iridectomy has been performed; (*b*) chronic glaucoma of long standing, with advanced degradation of vision; (*c*) chronic glaucoma with very much contracted visual field close to the fixing point, or even touching it.

CASE 5.—A man, aged sixty-eight, reported March 18, 1912. Vision of the right eye 6/24; the left eye had been removed three years before, at which time an upward iridectomy on the right eye had been performed. For three weeks vision had been failing. Ophthalmoscopic examination showed a deep glaucomatous cup, but the tension was not elevated, the tonometer reading being 25 mm. The field was circular in character and not more than 15 degrees in extent. Four days later Elliot's operation was performed; healing kind; good filtration; tension normal, and ten days later, with suitable correction, the vision had risen to 6/15. This was maintained for a considerable period of time, when there was rise of tension, controlled by a cyclodialysis performed by Dr. Shumway.

Comment.—In this patient the trephining primarily improved the visual acuteness, but did not create a permanent lowering of tension, which subsided only after a cyclodialysis had been performed. Doubtless the later failure of filtration was due to imperfection in the position of the trephine opening. It does not in the least militate against an opinion which I have formed that trephining to control rise of tension after the ordinary iridectomy has been performed for chronic glaucoma is a proper procedure and one that should be followed by good results if the trephine opening has been properly placed. It would certainly seem to me a far better operation than sclerotomy, either posterior or anterior, or, as used to be the custom in the olden times, the repetition of an iridectomy. I do not say this without having observed in several instances satisfactory results when this line of procedure was practiced, in one patient studied in consultation with a colleague, both eyes having been successfully trephined, after technically correct iridectomies had failed in their purpose.

Cases 6, 7 and 8: Chronic glaucoma with advanced degradation of vision.

CASE 6.—A man, aged forty-seven, reported for examination October 16, 1911; failing vision for four years; practically blind for a year. Pupils well dilated, irresponsive to light; opacities in each cornea; deep typical cups. Vision O. D. hand movements; O. S. faint light perception. After a month of eserine treatment, Elliot's operation performed on the left eye November 10, 1911, and on the right eye November 14, 1911. Good filtering scars were obtained in each eye. Gradually slight improvement of vision resulted, so that hand movements were readily detected with the right eye, and the vision of left eye rose from light perception to hand movements; eserine continued. The patient has not been seen for a number of months, but the slight improvement of vision described obtained for about a year after the operations. Prior to the operations the tension of the

right eye had been 65 and of the left eye 67. After the operation it was reduced to 10, and remained at this point.

CASE 7.—A man aged fifty-eight. The left eye had been destroyed by an explosion ten years before examination on June 13, 1912, producing phthisis bulbi. Right eye, vision hand movements; dilated immobile pupil; large deep glaucoma cup; advanced atrophy of the nerve; tension about 45 mm. As no good result followed the persistent use of eserine, Elliot's operation was performed on October 8, 1912. Perfect operative result; vision continued to be hand movements, but there was no improvement. This vision has been maintained to the present time.

CASE 8.—A woman, aged about fifty, reported May 18, 1912, the vision of the right eye being 6/12 and of the left eye light perception. On this left eye corneoscleral trephining had been performed eleven months previously and tension was normal; only dim view of fundus. Right eye shallow chamber, shallow cup, but no displacement of the vessels; finger tension not elevated; corneoscleral trephining December 2, 1913; perfect result; perfect filtering scar; tension 21; vision about 4/30.

Comment.—Case 6 illustrates these interesting facts: that faint light perception, which had been the only vision the patient possessed for a long period of time, improved to the ability to detect moving objects—indeed, to detect objects so that the patient could walk with some security in familiar surroundings—and that a very low tension was secured, which continued, owing to a perfect filtration. In one other patient (Case 7) no improvement in vision took place, but the hand-movement vision which existed prior to the trephining continued for a long period afterward, more than a year. Apparently the vision had been rapidly disappearing before that time.

On the other hand, Case 8 is interesting inasmuch as it shows that in spite of perfect filtration and a tension never exceeding 21 mm., there was slow degradation of vision, 6/12 prior to the trephining, 4/30 some months after it, while the fellow eye, which had been trephined one year previously, and in which filtration has always been perfect and tension is normal, is evidently entirely blind; release of tension does not always mean release of danger; atrophy of the optic nerve progressed in spite of perfect filtration. From my own personal experience and the experience which I have obtained in London clinics, and also in one or two clinical services in this country, I would say that trephining is perfectly justified in eyes with chronic glaucoma when light perception still remains, and that in a percentage of the cases (how great I do not know) the hope may be entertained that a slight improvement of vision, for example to hand movements, or the perception of large objects, may be the result.

Chronic glaucoma with very much contracted field close to the fixing point, or even touching it. Cases 9 and 10.

CASE 9.—A woman aged fifty-eight,

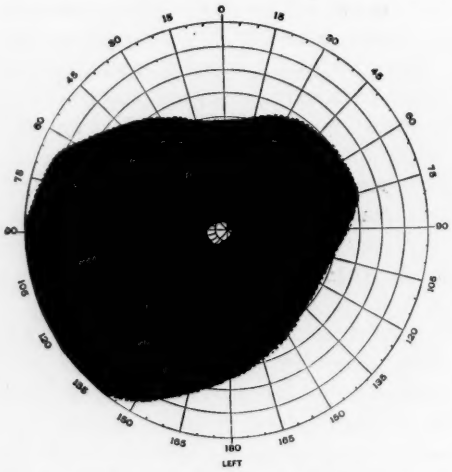

FIG. 3.—Case 9. Visual field of O. S. before corneoscleral trephining.

about eighteen months prior to consultation, had attacks of blurred vision of the right eye, which gradually increased until, according to her statement, as the result of the instillation of some drops vision was lost. Six months ago vision of the left eye began to fail in a similar manner. When examined June 13, 1913, the right disc was deeply cupped and completely atrophic; many vitreous opacities; tension 61¾; no l. p. Left eye showed vitreous opacities,

sharp pulsation of retinal vessels, and a moderate cup; tension 50¾. Under the influence of eserine and pilocarpine the high tension subsided and a vision of 6/9 was maintained, in spite of the very small field, which did not enlarge. Operation was urged, and Elliot's operation was performed on September 30, 1913, yielding a perfect filtering area and reducing the tension to 18; some enlargement of the field. The patient is extremely rheumatic, and just one month after the operation returned with a sharp iritis, with thick clump-like synechiæ. This gradually yielded to atropine and later to homatropine, several exacerbations having taken place. At the present time the vision, with suitable cor-

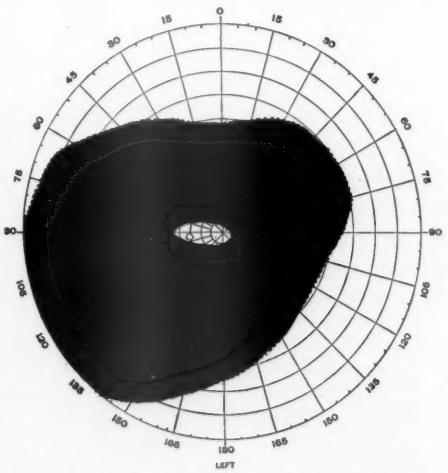

FIG. 4.—Case 9. Visual field of O. S. after corneoscleral trephining.

recting glass, is 6/9; the area filters perfectly; the disc is extremely white and deeply cupped. (Figs. 3 and 4.)

CASE 10.—A woman, aged sixty-three, reported for examination October 14, 1913. Poor vision began in the left eye ten years ago and four years ago in the right eye. There is a long history of halo vision; myotics had been previously used. The left eye was divergent and in a state of absolute glaucoma. The right eye was highly hyperopic; vision 5/15, much contracted field; tension 32½, deeply cupped disc, with vessels twisted at its bottom; Elliot's operation was performed October 17, 1913, without complication. When the bandage was removed the patient maintained that she could not see even light. This absence of light perception persisted for fully ten days. At the expiration of this time the patient acknowledged that she could see

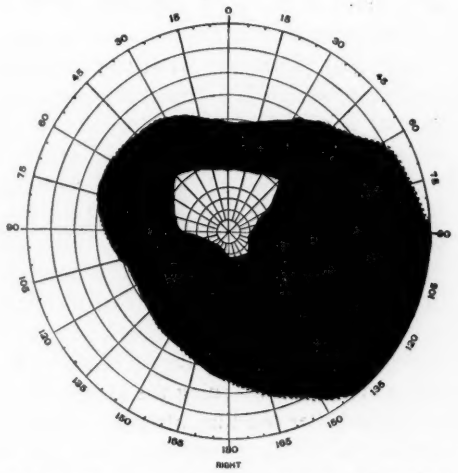

FIG. 5.—Case 10. Visual field of O. D. before corneoscleral trephining.

light from the window and ultimately large letters. Filtration was perfect; there was no hemorrhage, no choroidal detachment, and no obstruction in the media, and nothing to account for this degradation of vision. Ultimately, twenty-one days after

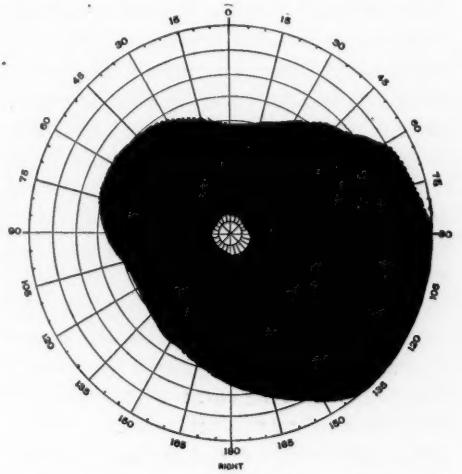

FIG. 6.—Case 10 Visual field of O. D. after corneoscleral trephining, showing marked contraction.

the operation, the filtering scar being in good condition, vision was 6/25, therefore not quite as good as that found prior to the operation. There was marked contraction

of the visual field after the trephining. The patient has not been seen or heard of since that date. (Figs. 5 and 6.)

Comment.—It must be the experience of every surgeon that in the presence of a very small visual field, especially if it is contracted close to the fixing point, or even touching it, iridectomy, no matter how correctly performed, is a dangerous operation in that it may hasten the degradation of vision. Case 9 indicates, it would seem to me (and I do not base this opinion upon the observation of this one patient alone, but on others studied elsewhere), that the danger of this complication which has followed iridectomy so frequently is less likely to arise after corneoscleral trephining and that the hope of saving the vision that exists, and even of widening the very narrow field, is a better one than after the ordinary procedures. I have not tried Lagrange's iridosclerectomy on an eye with exactly this state of affairs.

Chronic glaucoma with exacerbations, or subacute glaucoma:

I desire next to refer briefly to types of glaucoma characterized by periods, often brief ones, of rise of tension, slight steaminess of the cornea, halo vision, etc.—in short, subacute "attacks." The symptoms usually subside promptly under the use of myotics and the vision returns to normal. Gradually, however, there is slow degradation of sight, with increase in the optic nerve cup, and unless a satisfactory operation is performed the process sooner or later destroys the vision. Iridectomy performed on patients with this type of glaucoma is more apt to be successful, if the iris is not too much degenerated, than it is in the ordinary so-called non-inflammatory or non-congestive chronic glaucoma without exacerbations. That corneoscleral trephining is a satisfactory operation in circumstances like these, one or two case histories serve to illustrate.

Case 11.—A woman, aged 60+, reported in November, 1907. The right eye had been enucleated eight years before on account of glaucoma, an iridectomy having failed to check the disease. The left eye possessed a vision of 6/5. The visual field was normal, as was the tension; she had been using eserine persistently. The patient was not seen again for four years, when she reappeared with vision 6/30, a hazy cornea, a

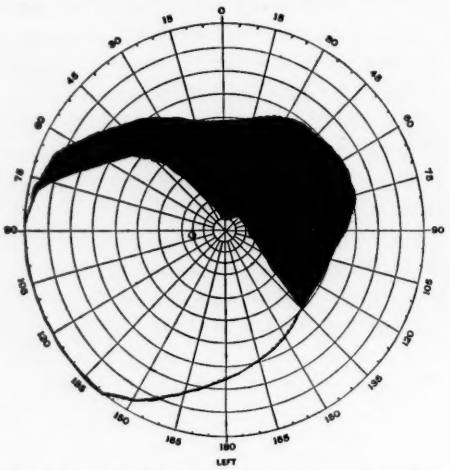

Fig. 7.—Case 11. Visual field of O. S. before corneoscleral trephining.

moderate superficial corneal infiltration which stained deeply, and a typical eserine conjunctivitis; tonometer 21. Under the influence of dionin and holocain and the

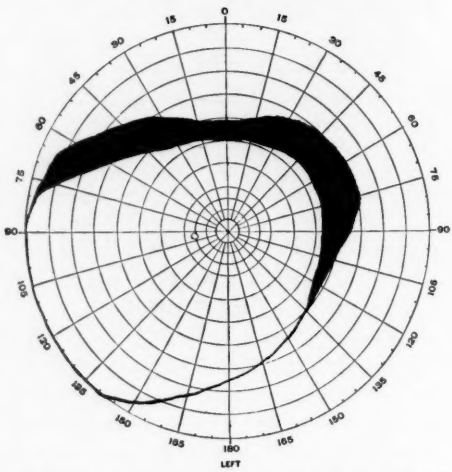

Fig. 8.—Case 11. Visual field of O. S. after corneoscleral trephining.

cessation of the eserine, there was gradual subsidence of this condition of affairs, and the disc could be seen to be partially cupped, the cup being situated chiefly in the lower and outer half. Vision rose to 6/9, and pilocarpine could be used without produc-

ing conjunctivitis. The field remained full. The tonometer never recorded a tension higher than 29¾. This condition of affairs continued until the summer of 1913, with frequent subacute attacks, when the vision slowly began to subside and nuclear opacity was evident. There was some contraction of the visual field, with a more or less typical loss of the upper and inner quadrant, and vision was reduced to 6/30. Operation was urged, and on September 24, 1913, Elliot's operation was performed without complication and with the production of a perfect filtering area. Tension was reduced to 14¼, and vision is maintained at 6/30. On the third or fourth day after the operation there were evidences of a quiet iritis, which subsided under the instillation of scopolamine. There is marked improvement in the visual field. (Figs. 7 and 8.)

CASE 12.—A woman, aged fifty, reported February 17, 1908, with the left eye completely blind from chronic glaucoma and atrophy of the optic nerve; she had used

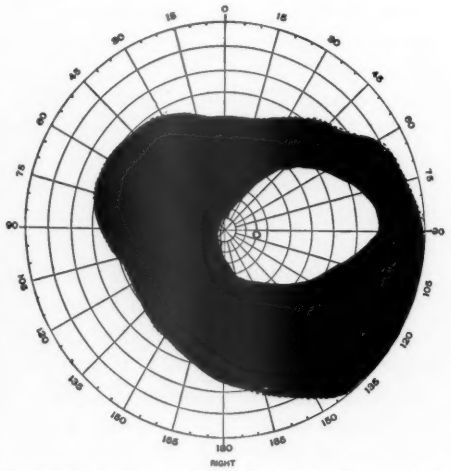

FIG. 9.—Case 12. Visual field of O. D. before corneoscleral trephining.

eserine for years; evidences of old bullous keratitis. There was chronic glaucoma of the right eye, but central vision was normal. The patient persistently declined operation. Vision was maintained by the use of eserine for four years, then it gradually began to decline, dropping to 6/9; this vision continued with some shrinking of the field for two years longer, when vision declined to 6/15. Many subacute attacks with halo vision occurred. The tonometer reading was usually between 40 and 50 mm. Finally consent for operation was obtained, and

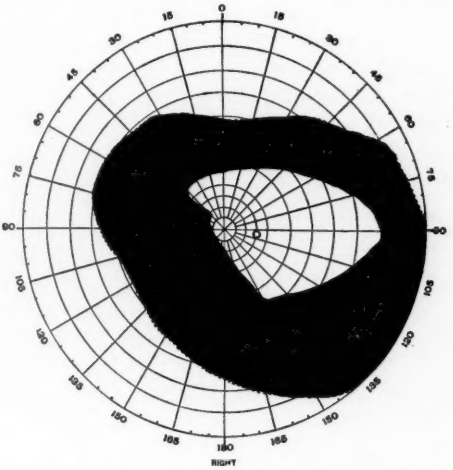

FIG. 10.—Case 12. Visual field of O. D. after corneoscleral trephining.

corneoscleral trephining was performed January 20, 1914; perfect filtering area; vision now 6/9; tension normal. (Figs. 9 and 10.)

CASE 13.—A man, aged 45, reported May 13, 1913. His left eye had been blind for ten years from absolute glaucoma. The vision of the right eye was 6/7.5; contracted field, typical cup. He had experienced many subacute attacks; even in the intervals the tension was 45½ mm. Elliot's operation was performed May 16, 1913; perfect filtering area, which remains perfect to the present time; tension normal; V=6/6. The left eye was also trephined; no permanent release of tension—that is, exacerbations of tension occurred, but are now controlled with eserine.

No comment is necessary, as the records speak for themselves.

CASE 14.—*Chronic glaucoma, with exacerbations, of the left eye; right eye absolute glaucoma.*

A man, aged forty-eight, reported November 12, 1913. The left eye was blind from absolute glaucoma, the lens being cataractous and the ball stony-hard. The right eye was slightly flushed; shallow

chamber, tension + 2, vision 6/9. Subsequent tonometric examination revealed a tension of about 45; field concentrically contracted. Elliot's operation was performed most skilfully by Colonel Elliot December 2, 1913. The next day there was enormous edema of the conjunctiva, as if a subconjunctival salt injection had been given, and very severe pain, which continued for several days, but which gradually subsided under the influence of holocain, dionin, and salicylate of sodium. The patient was dismissed from hospital seventeen days after operation with a vision of 4/9, or practically that which he had prior to the operation. Four days later he returned with very high tension and decided iritis, with fine and rather firmly attached synechiæ; vision 6/60; tension 65 mm.; cyclodialysis was performed, which reduced the tension to 36 mm., where it remained for a day or two but then rose again. This operation was repeated by Dr. Holloway, and subsequently a paracentesis of the anterior chamber was performed. Again there was rise of tension, and therefore I made an iridectomy, joining the coloboma with the small buttonhole made at the original trephining. Immediately reduction of tension to the normal point was secured, and this has been maintained until the present time; vision is now 6/15.

Comment.—Evidently the complications in this case depended in part on the development of iritis, and it is interesting and important to emphasize that complete relief was secured only after the performance of complete iridectomy.

Excessive conjunctival edema immediately following the operation is not necessarily a dangerous condition. I have seen this in several instances, followed by rapid subsidence and with perfect operative result.

Absolute Glaucoma.—I have trephined several eyes which had passed into the state of absolute glaucoma, eyes which ordinarily would have been submitted to an enucleation. In one instance the result of the trephining was good in that pain and exacerbations of tension could be controlled by eserine after its performance. Previously the eserine had been unsuccessful in alleviating these attacks. In another instance (Case 15) the operation was a total failure.

Case 15.—A woman, aged fifty, reported June 25, 1912; right eye was myopic 3 D; there was a large shallow cup, but the vessels were not displaced. The field was normal. The left eye had been blind for six weeks; no light perception; cornea edematous and opaque; pupil widely dilated; no view of fundus; tension + 3; very painful. After the use of eserine and salicylate of sodium without effect, posterior sclerotomy was performed by Dr. Holloway on July 16, 1912. High tension reappeared in thirty-six hours. Elliot's operation was next performed on July 26, 1912, without satisfactory result. As pain continued the eyeball was enucleated August 28, 1912. One year later, namely, September 26, 1913, the vision of O.D. was 4/30; tension and field normal.

Comment.—This failure may have been due to faulty technique, but I shall never again, if there is any light perception, even of the faintest character, condemn a so-called absolute glaucoma to an enucleation without trying the effect of a corneoscleral trephining. In illustration the following case is recorded:

Case 16.—A woman, aged forty-nine, reported for examination on the 29th of September, 1913. Vision of right eye 5/12. On this eye five years ago an upward iridectomy had been performed. The disc was deeply cupped and very pale; tension + ? The left eye was apparently in a state of absolute glaucoma, with deeply opaque cornea. The pupil 4 mm. in diameter was fixed and the scleral vessels were deeply injected; no reflex. A very faint patch of light perception was demonstrable in the temporal field. The tonometer registered 82 mm. This condition of affairs had existed for a long time. Elliot's operation was performed September 30, 1913; an unusually large filtering area was secured. Within two days after the performance of the operation fingers could be counted and

the cornea was clear enough to permit a view of the fundus; deep cup. The tension was reduced to 21½, and with suitable cor-

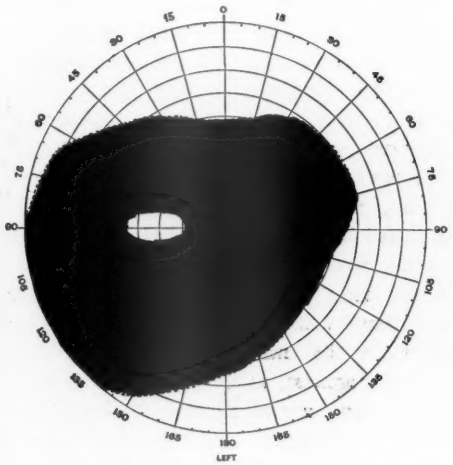

FIG. 11.—Case 16. Only faint l. p. in small area in temporal field before corneoscleral trephining.

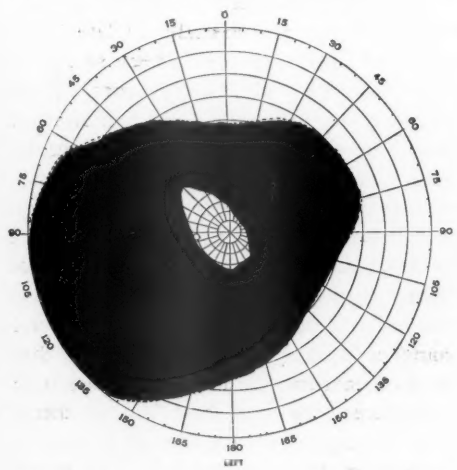

FIG. 12.—Case 16. Visual field mapped with 10 mm. square of white after corneoscleral trephining.

recting glass a vision of 6/9 was secured; last examination two months ago. (Figs. 11 and 12.)

CASES 17 AND 18.—*Staphyloma of the cornea with high tension.* A patient with unknown history presented herself with staphyloma of each cornea, very high but unmeasurable tension; some pain; much flushing of the sclera. Both eyes were trephined, and the operations were followed by the relief of pain and marked reduction of tension. There was no improvement in vision.

CONCLUSIONS.

I have never seen in my own experience an extensive hemorrhage into the anterior chamber, or the entrance of the scleral button into the anterior chamber. I have never observed a purulent infection, either primarily or at long periods, after the operation has been performed, in any patient of my own, although I have seen an infection a month or six weeks after trephining at the hands of another surgeon, the patient having come into one of my hospital services. Iritis after this operation occurs with irritating frequency (even Colonel Elliot admits this) and appears either as a quiet iritis, with almost no signs of inflammation of the uveal tract, but with the gradual development of soft synechia, very much as they occur in the so-called uvéite irienne of Grandclément, with lesions confined to the posterior layer of the iris, or as a sharp, ordinary plastic iritis which may arise at longer or shorter intervals after the eye has forgotten the effect of the operation, to use Mr. Carter's expression.[1]

What causes this quiet iritis? I do not think that any satisfactory explanation has been given. It certainly is not an infection in the ordinary sense of that term. It may be due to some change which takes place in the iris tissue as the result of decided reduction of tension, some disturbance of tissue metabolism, perhaps due to some toxic property which the aqueous humor begets. It is not necessary to assume that this complication must occur in every case, because we all know that a number of tissues of apparently exactly similar composition may be exposed to similar toxins, and one tissue become involved in one subject and the same tissue in another subject escape. We are rather ignorant in regard to the processes of detoxication. This much seems to me to be definitely necessary, namely: That unless the pupil is dilated, as Colonel Elliot says, the very early use of

[1]Parker's investigations indicate that iritis is much less apt to occur if a complete iridectomy is associated with the trephining.

mydriatics should be insisted upon. He uses atropine. I have preferred scopolamine or homatropine. Now the later types of iritis, more plastic in type, seem to me exactly analogous to those which we used to call tenth-day iritis after cataract extraction, and which are unquestionably infections caused by the sucking in through the filtering scars of contaminated conjunctival juices, for it is not necessary that a purulent material should form in each infection. All postoperative iritis of this character belongs to some type of infection.

I have never observed intraocular hemorrhage or detachment of the choroid after corneoscleral trephining.

Summarizing my experience with this operation, derived in part from my own operative work and in part from the operative work of colleagues here and abroad, I may record it as follows: I am unconvinced that corneoscleral trephining is a better operation in acute primary glaucoma than a technically correct iridectomy; I am convinced that it is a better operation in ordinary chronic so-called non-inflammatory glaucoma than the usual iridectomy, and that if an iridectomy in this disease has failed of its purpose, it is a wise operative procedure in place of a second iridectomy or a sclerotomy; in chronic glaucoma, with greatly contracted visual field, it appears to me to be a safer procedure than ordinary iridectomy, which so often has been followed in these circumstances by a rapid obliteration of this much contracted field; it is not a wise operative procedure if glaucoma is complicated with cataract; it is an operative procedure which should be thought of and in most instances practiced in glaucoma secondary to cataract extraction, at least in those eyes in which the vitreous and aqueous chambers are not in communication; it is a proper operation in absolute glaucoma; and, moreover, it may be repeated in the hope of preventing enucleation, although it can by no means be definitely promised that this prevention is assured; it does not seem to be an operation that is likely to meet with success in increased intraocular tension due to intraocular hemorrhage, thrombosis of the central vein of the retina, and blindness as the result of this type of glaucoma; it is an operation that may be tried in staphyloma and secondary glaucoma, but the outlook is not a brilliant one.

A serious objection to the operation is the frequency of iritis of both types, and it has seemed to me that the plastic type of iritis is more apt to occur in those patients who are liable to the so-called autotoxemic forms of uveitis and iridocyclitis, types which used to be classified as rheumatic and gouty iritis. The early type of iritis, quiet in its manifestations, should be guarded against, as Colonel Elliot advises, by the early use of mydriatics—in my experience, preferably scopolamine or homatropine. I make no further reference to delayed formation of the anterior chamber, to misplacing and buttonholing of the conjunctival flap, and specially to late infections, as they have recently been so elaborately described by various authors. If, as I said in the beginning, the whole story of glaucoma was increased intraocular tension, then this operation, or any other successful operation which induces permanent filtration, would come close to being the last word in the treatment of glaucoma, but I do not believe that increased intraocular tension is the sum and substance of this difficult and complex disease, and I am convinced that in its treatment, in addition to operative procedures, the very best line of therapeutics, suggested by elaborate studies of metabolism and with the aid of an expert internist, is required.

In conclusion, I would like to say that the judgment of the value of this operation, or, indeed, of any other operation designed for the purpose of checking the ravages of glaucoma, should not be based alone upon the estimations of the reduction of intraocular tension, important as this matter is. The preservation and the restoration and the improvement of visual acuteness, and the widening of the field of vision, should also be given prominent place as standards

in the estimation of its efficiency. It seems to me also that more accurate studies should be made in regard to the relationship of plus tension of an eyeball to the health of that organ than have thus far been put upon record, exactly as the clinicians have learned that arbitrary standards of vascular pressure cannot be set up, and that frequently there may be what Hobart Hare calls a pathological norm in arterial pressure which it is unwise to disturb. Dangerous as increased intraocular pressure is to the health of an eyeball, I suspect that we should, praiseworthy as our efforts are to get rid of such pressure, be careful that we do not originate another danger, to-wit: the creation of pathological changes brought about by too long-continued hypotony.

THE DIAGNOSIS AND TREATMENT OF CHOLECYSTITIS.[1]

BY DAVID RIESMAN, M.D.,
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The gall-bladder is a blind pouch with a precarious blood supply, in that and in some other respects resembling the vermiform appendix. It can be removed, as is well known, without danger to life—indeed, without noticeable harm to the body. Nevertheless, it fulfils a function and is far from belonging to the class of rudimentary organs. While the formation of bile is a continuous process, a liter or more being secreted per day, there are no doubt times when bile is needed in quantity, and against this need Nature provides a storage reservoir in the distensible gall-bladder. William J. Mayo (*American Journal of the Medical Sciences,* April, 1914) views the functions of the gall-bladder from a rather different aspect, holding that its chief purpose is to take the tension from the hepatic ducts and from the ducts of the pancreas. Another one of its functions is to produce mucus, which by diluting the bile lessens its capacity for producing those pancreatic complications that sometimes result from a chance entrance of bile into the pancreatic duct. It seems to me that these views do not exclude the older conception. We may therefore assume that the gall-bladder has three chief functions—that of reservoir; that of tension reliever to the common, hepatic, and pancreatic ducts; and that of generator of a protective mucus.

The gall-bladder possesses the usual coats of mucous membrane and for part of its surface has a peritoneal investment. On microscopic examination the mucosa presents certain invaginations, the so-called Luschka's canals or diverticula, to which Aschoff and Bacmeister ("Die Cholelithiasis," Jena, 1909) attach great importance in the development of pathologic conditions.

The inflammations of the gall-bladder are those that affect other organs or tracts lined by mucous membrane, namely, catarrhal, suppurative, ulcerative, pseudomembranous, phlegmonous, and gangrenous. In addition there is, as in the case of the appendix, a chronic fibrous and an obliterative cholecystitis. Cholecystitis and cholangitis are often associated, but as a rule one or the other dominates the picture.

Cholecystitis is due to bacterial infection. Upon this all men are agreed, not however upon the pathway by which the organisms reach the gall-bladder. The easiest way would seem to be by retrograde transport along the bile ducts from the intestine, but Deaver's view with regard to the pancreas holds probably for the gall-bladder, namely, that an ascending or duct infection is uncommon. It is much more probable that the bacteria reach the gall-bladder with the bile direct from the liver, this organ excreting the bacteria brought to it by either the portal or the systemic circulation. The well-known fact that inflammation of the common duct or its obstruction leads to inflammation of the gall-bladder at first sight would point to an ascending convection of bacteria, but the matter becomes

[1]Paper read by invitation before the Philadelphia Clinical Association, June 1, 1914.

clear when we remember that such local conditions in the duct interfere with the drainage of the gall-bladder and allow the bacteria brought to it by the bile from the liver to thrive and multiply. The bile has very feeble antiseptic power, and for some bacteria, especially those of the typhoid group, is a good culture medium. Nevertheless ascending inflammation must be reckoned with as a possibility since the secretory pressure of the bile is very low.

The presence of typhoid bacilli in the bile is almost constant in typhoid fever if one may judge from the findings in fatal cases. This fact has led some to the extreme view that typhoid fever is primarily a blood infection, the intestinal involvement being the result of the bacteria reaching the bowel with the bile. The survival of typhoid bacilli in the gall-bladder is an important fact. It accounts for a large number of typhoid carriers that are such a problem to the sanitarian, and, secondly, it predisposes to gall-stone formation.

Granting that cholecystitis is practically always bacterial, it is necessary to take cognizance of a number of predisposing conditions without which cholecystitis rarely occurs. One of the most important is stagnation of bile. I have already referred to this. It is brought about by a hindrance to the outflow of bile. The cystic duct is so constructed that it can become easily blocked; while the common duct has not only a relatively very tiny opening, but also in two-thirds of all cases runs through the substance of the pancreas and is subjected to pressure when that organ swells.

Clinically the most frequent association of cholecystitis is with gall-stones. By interfering with the drainage of the gall-bladder or by direct irritation gall-stones favor inflammation and therefore constitute by far the most important immediate cause of attacks of cholecystitis. It is necessary to discuss the origin of gall-stones in order to have a better conception of their effects. Though the object of much research the formation of gall-stones still remains a mystery. Stagnation of bile is an important antecedent factor and may of itself give rise to a precipitation of cholesterin and formation of pure cholesterin stones. Infection does not seem to be necessary for the formation of pure cholesterin stones. Aschoff and Bacmeister believe in a cholesterin diathesis, which is said to be intimately related to abnormal fat metabolism, a hypothesis that so far has very little basis in fact.

More important than the conditions I have just described is infection as a factor in the production of gall-stones. As I have indicated before, bacteria are eliminated in the bile and many, like the typhoid, paratyphoid, and colon organisms, may become agglutinated and form the nucleus of stones. The presence of viable typhoid organisms in the interior of stones years after the original attack of typhoid fever has been repeatedly demonstrated.

Gall-stones when once formed, whether by simple precipitation or by infection, may remain dormant in the gall-bladder for a long time, and in such a case any inflammation of the wall of the organ may completely subside. It would carry me too far away from the subject assigned if I were to consider to what extent such apparently latent gall-stones are really "innocent." In the majority of cases when a gall-stone exists sooner or later something will happen. It may be an attack of biliary colic; it may be obstruction of the cystic or common duct; it may be pancreatic disease; and it may be—and this alone concerns us here—cholecystitis.

But though in a clinical sense gall-stones are by far the most important factor in the production of cholecystitis, we must not forget the comparative frequency of non-calculous cholecystitis. As an acute condition this occurs in typhoid fever, in septicemia, perhaps in pneumonia, in food poisoning—indeed, in all sorts of infections. It may be catarrhal and so mild in its manifestations that it passes unnoticed, and then, of course, no history of it is gotten in later years when the patient comes under the observation of the physician for gall-

stone disease. It may be severe, resembling an attack of biliary colic. There is pain, tenderness, and swelling in the region of the gall-bladder, with rigidity of the right rectus muscle and leucocytosis. Usually it is possible to make out some enlargement of the liver, and on careful palpation the gall-bladder may be felt. Jaundice will occur if in addition to the cholecystitis there is inflammation of the small biliary channels—cholangitis. It is probable that in many cases of this kind a localized peritonitis, a sort of protective inflammation about the gall-bladder, is developed. In that way at any rate we may account for the frequent adhesions between the gall-bladder and neighboring structures in the absence of gall-stones. In severe cases the symptoms are identical with those occurring in cases of calculous cholecystitis. Hence it is not always safe in a given case of cholecystitis to state positively that gall-stones are present, as the operation may not show them. Some men are extremely cautious in diagnosing gall-stones, and are disinclined to go beyond the non-committal diagnosis of "an inflamed gall-bladder." I would, however, be a little bolder, and if the patient is in middle life and has had a similar attack or has had typhoid fever or some analogous infection, I would go on record with a diagnosis of cholecystitis due to gall-stones.

Non-calculous cholecystitis seems occasionally related to a diseased appendix or to inflamed hemorrhoids. As a considerable period of time may intervene between the original disease and the cholecystitis, the connection is not always determinable except at operation or at autopsy.

The gall-bladder in the non-calculous form of inflammation may be large, as stated by William J. Mayo (*American Journal of the Medical Sciences,* April, 1914), and may be filled with a thin, foul-smelling bile; or it may be small, thick-walled, whitish, shrunken, containing a thick, tarry bile nearly of the consistency of soft india-rubber. The mucous membrane has a strawberry appearance, being dotted over with tiny yellow specks representing denuded villi. Adhesions to neighboring structures are very commonly present.

Cholecystitis is not very rare in elderly persons who have never had any attacks of biliary colic or other symptoms pointing to gall-bladder trouble. The condition, though quite characteristic, is apt to pass unrecognized. It resembles and often is called ptomaine poisoning. There is a history of indiscretion in diet followed by a sudden attack of epigastric pain with nausea and vomiting, prostration, and fever. On the second or third day an enlargement in the liver region with marked tenderness on pressure can be made out. In some cases chills occur, but jaundice I have not seen. Slight hypostatic congestion of the lungs is often present. For several days the right upper quadrant remains tender and the stomach continues irritable. Then gradually the symptoms subside, but for a variable length of time a tell-tale tender point below the margin of the ribs on the right side can be detected.

The following case is typical of this form of cholecystitis: Mrs. H. L., seventy-five years old, whom I had the pleasure of seeing with Dr. Wise, had been at a bridge party and had eaten abundantly of rich food at a late hour. She was seized in the night with pain in the upper abdomen, vomiting, and chill. She had some fever the next day. When I saw her several days later she still had pain in the upper abdomen, but the tenderness was most marked in the right upper quadrant. There was considerable enlargement, which I took to be the gall-bladder, though the liver itself seemed somewhat swollen. There was no jaundice. She had several chills and fever during the next two or three days. The urine contained albumin, casts, and blood, but these disappeared soon after the gall-bladder inflammation subsided.

In another case, a woman of eighty, a similar attack, the first in her life, apparently followed the eating of salmon. There was distinct enlargement of the gall-bladder, marked tenderness, hypostatic conges-

tion of the lungs, moderate fever, no chills. The attack lasted about four weeks, and even now, eight months afterward, there is still occasional soreness and tenderness in the gall-bladder region.

Perhaps the most important conclusion that could be drawn from these cases is that in so-called ptomaine poisoning or cholera morbus it is well to make a careful examination, paying particular attention to the right upper quadrant of the abdomen.

Suppurative cholangitis, which is commonly termed empyema of the gall-bladder, rarely arises without stone, and is most likely to occur when the stone is in the cystic duct. Acute empyema presents itself at times as one of the most fulminant of diseases, ending fatally in two or three days through rupture of the gall-bladder and general peritonitis. In less severe cases the symptoms are those of localized peritonitis with pain, tenderness, and rigidity of the muscles in the right upper quadrant. The pain may partake of the character of biliary colic or it may be intermittent and sharply cutting. There is fever, accelerated pulse, vomiting, leucocytosis, rarely jaundice. If the warmed hand is lightly laid upon the right upper abdomen the large pear-shaped gall-bladder can usually be felt, more easily if a rolled-up blanket is placed under the small of the back. If one crouches down on a level with the patient the swelling produced by the gall-bladder can sometimes be seen. Often, however, the gall-bladder itself cannot be felt with certainty, but instead an enlargement continuous with the right lobe of the liver can be detected, the so-called Riedel's lobe.

At operation the gall-bladder is found tense and distended with a mucopurulent fluid free from bile. There may be a single calculus, which is often a cholesterin stone, or a number of dark, faceted calculi. On bacteriological examination the majority of cases show the bacillus coli communis with or without pyogenic organisms, or, in rare instances, the typhoid bacillus.

Little need be said about phlegmonous and gangrenous cholecystitis. They are similar to the suppurative, only a stage or two more advanced. In both, the cystic duct or the neck of the gall-bladder is usually blocked by a stone.

Acute forms of cholecystitis to which I have referred may readily be mistaken for appendicitis. The following case is an illustration: B. M., a slender young girl, twenty-one years of age, had what appeared to be an ordinary attack of influenza. Being somewhat prostrated by it I advised her, after the fever had reached normal, to go to Atlantic City. On the day she was to leave she was seized with sharp pain in the lower right quadrant of the abdomen; at the same time there was a rise in temperature. The surgeon who saw her with me thought as I did that she had appendicitis, and made the ordinary appendiceal incision. Finding, however, that the appendix was normal the incision was enlarged so as to take in the gall-bladder. To our surprise this organ was tense to bursting, purplish in color, and when opened contained pus and a large pale stone that had evidently been there for a long time.

I have also seen a case in which a diagnosis of perforated gastric ulcer had been made by the family physician, the operation revealing empyema of the gall-bladder and gall-stones. In another case seen in consultation a diagnosis of uremia had been made on account of persistent vomiting and the presence of albumin and casts in the urine. I was, however, able to demonstrate enlargement of the gall-bladder, and under treatment the patient completely recovered.

Chronic empyema and chronic hydrops give rise to a movable tumor in the right upper quadrant which may be mistaken for an enlarged kidney, hydronephrosis, or ovarian cyst. It may be differentiated from the kidney by the fact that upon inflation of the colon the tympany is found behind the tumor if it is the gall-bladder, and in front if it is the kidney. Usually the distended gall-bladder can be pushed far over to the left.

The Sequelæ of Cholecystitis.—Aside

from gall-stones, of which cholecystitis is both a cause and an effect, a number of other conditions are often associated in a more or less secondary way with cholecystitis. From the functional standpoint dyspepsia, pain, and distress in the right upper quadrant of the abdomen, and at times constipation, are the most common. The dyspepsia is of the flatulent, nervous variety, with or without hyperchlorhydria, and usually extends over a period of years. It differs but little from the dyspepsia now known to be dependent upon chronic appendicitis. The patients are usually highly neurotic, and if they are women often have one or more ineffectual rest cures back of them when they come to us. From the anatomic standpoint the sequelæ of cholecystitis are empyema and hydrops of the gall-bladder, adhesions, cholangitis, and pancreatitis. Duodenal ulcer is sometimes associated with cholecystitis, but probably if the connection is not accidental the ulcer antedates and is the cause of the cholecystitis.

The *treatment* of cholecystitis is not as simple as the treatment of appendicitis and cannot be dismissed with one word—operation. The acute catarrhal forms, whether accompanied by stone or not, and MacCarty (*Annals of Surgery,* 1910, vol. 51) has shown that stones are present in 69 per cent of cases, usually yield to medical treatment. This consists in the application of either heat or cold according to the preference of the patient. If heat is employed I like to use hot, wet compresses frequently changed, or the electric thermolite, or the German thermophor. Internally I employ urotropin, usually with salicylate of soda. The patient should drink freely of water. The stomach should be spared as much as possible, the best food for the first day or two being buttermilk in small quantities. If the attack assumes the proportions of a biliary colic the use of morphine cannot well be avoided. The patient should be kept in bed until the acute symptoms have subsided, and for a long time thereafter he must avoid exposure to cold, fatiguing labor or exercise, cold drinks, and rich dishes. I have found it advantageous to have the patient continue the hot compresses, applying them for from one-half to one hour before rising and after retiring. Medicinally I usually prescribe in the interval a capsule composed of

Sodium salicylate,
Sodium succinate,
Ox gall, ää 2.0.

M. et div. in capsul. XII. S.: One three times a day.

If a laxative is necessary sodium phosphate or Carlsbad salts in hot water, which the patient sips while dressing, may be employed.

A word might be said about watering-places, of which Carlsbad above every other enjoys a world-wide fame. No one for a moment believes that the waters, even if they are radioactive, dissolve gall-stones, and yet that great benefit is derived from treatment at Carlsbad and similar resorts cannot be denied. It is probable that the treatment in vogue there subdues inflammation; cures as it were the cholecystitis and cholangitis, and thus restores the *status quo* in the biliary tract.

Operative treatment is clearly indicated in all cases of suppurative cholecystitis —that is, empyema of the gall-bladder —for without operation the mortality in the acute cases is exceedingly high, and but little lower in the long run in chronic cases. Acute empyema of the gall-bladder is indeed as clearly an operative condition as perforation of a gastric or duodenal ulcer. Operation is likewise indicated in cases of recurrent attacks that incapacitate the patient, a condition that in a paper on gall-stones I have designated as *status colicus;* and further, in cases in which the cholecystitis is evidently dependent on gall-stones and does not subside, especially if there is evidence of blocking of the cystic or the common duct.

Under the caption sequelæ I have pointed out a number of conditions that are attracting more and more attention as the clinician, the surgeon, and the pathologist

jointly study them. Knowing that long-standing flatulent or nervous dyspepsia, chronic pancreatitis, acute pancreatitis with fat necrosis, and acute empyema of the gall-bladder, diabetes, and cancer are possibilities hanging over the patient's head, we ought I believe be more ready to refer such cases to the surgeon; though surgeons themselves differ in their attitude toward this problem. Kehr, the great German pioneer in gall-bladder work, is surprisingly conservative; Mayo and Deaver are radical. From what I have seen I lean strongly toward the view of our American surgeons.

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THE SURGICAL TREATMENT OF CHOLECYSTITIS.[1]

BY JOHN B. DEAVER, M.D., LL.D.,
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It gives me pleasure, with a few exceptions, to concur with Dr. Riesman in the position he has taken in his paper.

In my experience cholecystitis, excepting the suppurating, gangrenous, and phlegmonous types, recover from the acute attack if properly handled; by which I mean, patient in the sitting position, absolutely nothing by the mouth in the presence of a localized or diffusing peritonitis, until there is restoration of peristalsis; ice to the abdomen; constant saline by the Murphy method. In the presence of vomiting, no medicine, but stomach lavage. This is also the line of treatment to be observed in acute cholecystitis occurring in typhoid fever. It is preferable to operation in my experience.

In the graver forms of cholecystitis in the absence of diffusing peritonitis—operation. In the presence of diffusing peritonitis, the type of treatment I have referred to, until the peritonitis has subsided, when the gall-bladder should be removed. The advantage of removal over drainage of the gall-bladder is to prevent serious infection of the pancreas in particular and the liver as well. A percentage of these cases treated along medical lines solely, result in cholangitis and would be the better for early operation. Drainage instituted late in cholangitis does not accomplish by any means what it will if done early.

The question of drainage as against removal of the gall-bladder is a very important one and should be governed by the amount of disease of the gall-bladder, and in particular the presence of enlarged lymph glands: I refer to the chain along the common duct, especially the one at the junction of the common duct and duodenum, where the common duct passes behind the duodenum.

It is interesting to note the various avenues by way of which infection reaches the gall-bladder, namely, portal circulation, common duct, systemic circulation, through the lymphatics, and by juxtaposition. Also that the most common form of bacilli met with is the colon bacillus, next the typhoid bacillus, and then the pyogenic organisms, staphylococcus pyogenes aureus, etc. In fifty per cent of the cases at the German Hospital when a culture was taken the bile was found sterile; this does not prove, however, that the gall-bladder wall itself is not infected, and therefore capable of infecting the pancreas and liver, making more indications for removal than for drainage. Chronic cholecystitis with recurrent attacks, in the absence of other conditions, certainly warrants operative interference. I have very little faith in medicine under these conditions or treatment at the various watering-places.

To the contrary many more people would be benefited and there would be fewer cases of diabetes, chronic pancreatitis, chronic liver conditions in the shape of cirrhosis, etc., if instead of going to watering-places after recovery from an attack they would visit the operating table.

[1]Read before the Philadelphia Clinical Association, June 1, 1914.

EDITORIAL.

PHYSIOLOGICAL INVESTIGATION AND CARDIAC THERAPEUTICS.

For many years the medical profession has been so intent upon the investigations which have had to do with the combating of infectious diseases that it has been turned aside from the advances which have been made in physiology and pathology in the sense that pathology is morbid physiology and not morbid anatomy.

Nevertheless many physiologists and clinicians have devoted much time and effort to the elucidation of problems in connection with the heart, and these investigations into the function of the heart, both in health and in disease, have inevitably pointed the way to a better conception of the conditions which a clinician is often called upon to treat.

Our readers will remember that when most of them were students the cardiac movements, like the movements of other muscles, were supposed to originate in nervous impulses, but it has become increasingly evident that this neurogenic theory of cardiac contraction must be cast aside and that the myogenic conception must be firmly adhered to. The primitive cells or tissues developed in early embryonic life persist as the point of origin of cardiac contractions through the individual's existence, and this bundle of tissue has been well called the "pace-maker" of the heart, since upon its activity the speed and rhythm of cardiac contraction depend. From this area, composed of primitive cells, the impulses pass over the wall of the auricle, causing it to contract, and then proceed over the bundle of muscular tissue, discovered by His, to the ventricle, which, in turn, responds to the impulse which it has received. The speed and the rhythm of the impulses arising in the primitive tissue forming the sino-auricular node are controlled in small part by the accelerator nerves and in large part by the inhibitory fibers of the vagus. These cardiac fibers of the vagus are called by modern physiologists chronotropic fibers. For these reasons it has been well said that the movements of the heart, while automatic like those of a horse, are nevertheless controlled by the vagus fibers, which exercise the function of the reins by which the horse is driven.

It has been known for several years that the chief function of the vagus is not exercised upon the ventricle directly but upon the primitive tissues to which we have referred in the sino-auricular area. It has also been known that the vagus diminishes the ability, or, in other words, decreases the conductivity, of the bundle of His at the auriculoventricular conjunction, and so it has come to be recognized that digitalis in full doses is capaple of producing partial or complete heart-block just as the lesion produced by disease in His's bundle may induce such a condition. For this reason we have frequently pointed out that the administration of full doses of digitalis in cases of partial heart-block, due to disease, might prove unwise in that it would induce complete heart-block by adding the diminution of conductivity induced by digitalis to the diminution of conductivity produced by disease. On the other hand, basing our opinion upon the scientific experiments of others and upon clinical experiences, we have pointed out that in those cases in which complete heart-block exists, or in which auricular fibrillation is present, full doses of digitalis do good, since the ventricle, being cut off from the influence of the vagus, can no longer be slowed by this nervous mechanism, but being directly stimulated by the muscular effect of the drug increases its force and its speed. These facts are so well known to those who have followed this subject with care as to be by no means novel.

Clinicians constantly meet with cases in which the conditions are puzzling in that the symptoms do not indicate well-defined lesions and the administration of remedies is not followed by the relief which is ex-

pected. Such results do not indicate that the facts to which we have referred above are erroneous, but only that our knowledge of cardiac physiology and pathology is as yet distinctly limited.

In this connection a research reported by Meek and Eyster in the *American Journal of Physiology* of July 1, 1914, is of very great interest. These investigators, as well as others, have shown that heart-beats arising outside of the specialized tissues, which we have spoken of, may be said never to occur. They have also shown that the primitive cells which form the sino-auricular node are most active in their highest parts and that, to use their words, the specialized tissue of the heart very often exhibits downward and progressively diminishing degrees of automaticity In other words, when the rhythm of the heart arises from the highest parts of this system the rate is maximal, other conditions remaining constant, and when it arises from the lowest parts the rate is minimal. Intermediate rates result from intermediate parts assuming the rôle of pace-maker. It is interesting to note that the more highly developed the pace-maker the more richly is it endowed with fibers from the vagus. In other words, it is more sensitive and responds more readily to vagus activity. For this reason very slight variations in the activity of the vagus may produce considerable changes in rate if the highest pace-making cells are intact, whereas great increase in the activity of the vagus is necessary if the lower portions of the pace-making cells are the chief factors in cardiac contraction.

In other words, it is becoming increasingly evident that changes in cardiac action in cases of disease may depend upon very minute lesions limited to very small areas, and, if this be true, it also follows that the action of a drug like digitalis, which exercises the double function of stimulating the vagus on the one hand and of stimulating the heart muscle on the other, will vary greatly according to the exact site of the lesions just referred to. Thus if the lesion be in the highest part of the sino-auricular node a dose of digitalis which would ordinarily slow the heart may be quite impotent, and the physician may have to vary his dose in order to get that quantity which will affect the lower cells or tissues still uninfluenced by disease.

The experiments of Meek and Eyster, as well as those of other investigators, reveal another fact of very great interest as illustrating the care with which nature has endeavored to protect vital functions as far as possible. If the impulse which causes cardiac contraction had no other point of origin than the sino-auricular node, any disease or injury to this node would cause death, but it has been found that when this pace-making node fails the seat of impulse formation migrates downward, and when all the cells concerned in giving rise to an impulse in the sino-auricular tissue and immediately below it are destroyed the auriculoventricular node takes up this function and keeps the ventricle going, although the auricle may be by this time only a passageway for the blood. Meek and Eyster believe that if the vagus is powerfully stimulated it may produce a functional condition practically identical with the one produced by disease to which we have referred. In other words, it may cause partial or complete abolition of the pace-maker in its highest portion and by diminishing its automaticity cause the centers of cardiac contraction to descend from the upper part of the sinus node, where its contractions normally originate, to the lower part of the sinus node, and finally even to the auriculoventricular node, which is practically another way of saying that digitalis may induce complete heart-block.

Possibly the practicing physician may think that this is rather an academic and theoretical matter. We do not think it is. These little lamps of fact are beginning to throw light upon problems in physiology, pathology, and therapeutics which promise to be of the greatest possible importance in the proper administration of cardiac remedies in grave cases of disease, and it behooves every physician who does not wish to practice "by the rule of thumb" to keep

abreast of these investigations in order that his efforts for the relief of a large class of patients may be successful.

ANOTHER WORD AS TO THE TREATMENT OF SYPHILIS.

Probably because physicians are continually called upon to treat disease which threatens life they are, like the laity, inclined to grasp with avidity any new remedy which holds promise of better things in therapeutics. Their very anxiety to produce a cure and to relieve physical and mental suffering causes them to be optimistic, and only when they have been grievously and repeatedly disappointed, and sometimes not even then, are they prone to lose this optimism.

One of the reasons for loss of optimism concerning the value of any given remedy is not so much a fault in the remedy as in the failure of the physician to recognize that after disease has been in existence a considerable period of time, such changes have taken place, both functional and organic, that the remedy has at least three duties to perform: first, to remove the actual cause of the disease; second, to heal damaged tissues; and thirdly, to reestablish functional activity in such a way that the action of a given organ or organs becomes entirely normal. Manifestly, such expectations on the part of physician and patient and such actions on the part of a drug can only occasionally be met, but if the physician continues to keep abreast of the advances made in physiology, pathology, and bacteriology, he will often recognize that a cure in every sense of the word is impossible, and instead of becoming pessimistic, when his remedies fail, will really be optimistic or grateful that he has in hand remedies which are of any value at all, and which, hand in hand with Nature's reparative processes, may at least better the patient.

We have emphasized these points on previous occasions, and our attention is called to them once more by a consideration of our present knowledge concerning the drugs which are used in the treatment of that well-nigh universal disease—syphilis. As we have pointed out on a previous occasion it apparently has become a well-established fact that neither salvarsan nor neosalvarsan has substituted itself for the older mercurial preparations which have been known for generations to be effective. Indeed, it may be said that at most the newer arsenical compounds only do half the work, and in some cases not that—the other half, of necessity, being carried out by mercury in some form. So, too, we have pointed out, as have many others, that many years must pass before a correct estimation of the curative effects of salvarsan can be attained. It is probable that time will show that the doses used must vary very largely with the condition of the patient and the virulence of his infection, and while it may be considered at this time that salvarsan certainly destroys the spirochæta, we do not know that it destroys it quickly enough to prevent all damage to nervous or other tissues.

A consideration of the literature of this subject shows very clearly that neither of these new compounds of arsenic is capable of doing all that we desire, and some clinicians have been so disappointed in the results that they have obtained that they seem to be almost inclined to regard them as remedies worthy of little confidence. Thus, Klotz goes so far as to oppose the use of these substances, asserting that mercury and the iodides, if employed with proper judgment and continued for a sufficient length of time, will do more than salvarsan after the initial stage of the disease has passed by, and in hereditary syphilis Levy-Bing and Duroeux state that they do not think that salvarsan or neosalvarsan is the best remedy. Other clinicians seem to agree with this view, asserting that if we wish to protect children of syphilitic parents, it is essential that the mother should receive mercury and that salvarsan shall not be the sole remedy. A very large number of those who have had large experience in the treatment of syphilitic parents and children seem to agree with this view. Thus, Shields has

been so unfortunate in his use of salvarsan as to believe that it is not to be relied upon to abort or cure the malady, and others consider it only a useful aid to mercury. Wilson thinks that the present use of salvarsan is a form of therapeutic hysteria, and states that its common use is an "overriding of science by commercialism," and expresses the startling view that if more judgment is not used in relying upon salvarsan, we will find, to our cost, that there is a great increase in the number of children who are born syphilitic. Others, taken aback by the occurrence of fatalities after salvarsan has been used, are afraid of it, seemingly overlooking the fact that the percentage of fatalities recorded up to date is so small as to be almost negligible in one sense.

That late syphilis of the nervous system is only partly prevented by the use of salvarsan would seem to be a fairly-well determined fact, and that salvarsan given intravenously is of very little value when the nervous system has suffered from syphilis over a considerable period of time has certainly been settled. This is not because the salvarsan is, in itself, incapable of acting upon the infecting parasite, but because the parasite is hidden in tissues to which the salvarsan cannot gain access, and if perchance it does gain access, it, directly or indirectly, acts upon the nervous system.

It may be fairly stated, therefore, that while salvarsan is our best remedy in combating primary syphilis, just as water is our best remedy in combating fire, it has no power to remove the results of infection; whereas mercury seems to possess this power to a considerable degree. This also holds true in regard to visceral changes in other parts of the body than the central nervous system, gummatous growths being influenced more favorably by mercury, when properly administered, than by salvarsan.

While, however, there are many who have been disappointed in the action of the newer arsenical compounds in the treatment of syphilis for reasons which are obvious, there are, nevertheless, others who still maintain their confidence and strongly advocate their value. Some of these, as for example de Aja, assert that those who have failed to get good results have failed because they have been afraid to administer adequate doses, and a number of other authors indorse this view, pointing out that no drug, if given in insufficient quantity, can be expected to accomplish the results desired. So strongly do some clinicians advocate this view that Whitehouse and Parke assert that when the disease does not yield to salvarsan, the disease is not syphilis.

This brings us to the question of dosage. It would seem evident that all of the drug should be given that the patient can stand, using large doses occasionally rather than small doses very frequently, thereby getting a maximum effect at each dose and allowing time for the body to eliminate the dose and deal with the toxins which are set free by the destructive action of the salvarsan upon the spirochætæ.

That salvarsan is very much more efficient than neosalvarsan, even when the dose given of the latter drug is considerably larger, also seems to be proved. Nevertheless, its greater safety cannot be denied, and in cases which are not urgent it is perhaps the remedy of choice, at least until it can be determined that the patient withstands the treatment satisfactorily or that the neosalvarsan is not sufficiently powerful for the task set before it.

To express what we have said in a concrete form, it may be stated that salvarsan has its greatest field in arresting the infection in its early stages, and that mercury still holds the fort in the later stages and probably in the early stages as well. Or, again, to express it differently, syphilitic patients should receive both remedies, not simultaneously but in sequence.

PAINFUL SHOULDER.

Physicians are not infrequently consulted in regard to pain in the neighborhood of the shoulder-joint without there being any history of strain or other injury. The diagnosis naturally, and properly, in a consid-

erable number of cases, is that the patient is suffering from neuritis, and treatment directed to the relief of this condition is promptly instituted, two sets of remedies being administered—those which are designed to relieve the pain, such as phenacetine, acetanilide, and antipyrin, while the other class consists of the salicylates and iodides, the first of which are also pain-relievers, and both of which exercise some, as yet undetermined, alterative effect whereby the underlying conditions are removed and the pain is more or less completely relieved. It not infrequently happens, however, that these cases do not yield to the line of treatment just described, and then local applications by means of hot compresses, heat derived from electric lamps or the high-frequency current are resorted to. The latter measure often gives relief when all others have failed. For some unexplained reason, too, the exposure of the part to the *x*-rays when using these rays for diagnostic purposes sometimes for a brief period greatly diminishes the pain.

It is important to remember, however, that when cases are obstinate other causes than neuritis or muscular rheumatism must be carefully considered. A valuable article on this subject is contributed by Buckley to the Proceedings of the Royal Society of Medicine for May, 1914. In this article, in which he quotes work done by Thomas and Codman in this country, Buckley carefully considers the anatomy of the shoulder-joint and points out that injury to this joint rarely induces serious consequences, probably because of the mobility of the scapula and clavicle, whereby any sudden jar or strain is partially compensated for; certainly to a greater extent than occurs in the hip-joint. On the other hand it is to be recalled that the position of the cords of the brachial plexus, which are close to the joint on its anterior and axillary aspect, with the circumflex nerve winding round the neck of the humerus, brings these parts into a position, or zone, in which they may be readily damaged.

As Buckley points, out, however, a frequent cause of pain and stiffness in the shoulder is inflammation of the subacromial bursa. This pain is by no means constant, but appears in its exaggerated form when the patient attempts to lift the arm above the level of the shoulder or to rotate the humerus. Furthermore the patient complains that he cannot place his hand back of the head nor on the back at his waist, and, if the shoulder-blade be fixed by the hand of the physician, the arm can be raised from the side only to a very limited degree. This is due to the fact that the supra- and infraspinatus muscle tendons and, to a less degree, the tendons of the teres minor lie in the floor of the bursa, and if the bursa is inflamed any movement of these tendons is naturally extremely painful and often fixes the arm by spasm. For obvious reasons there is no pain if the arm is moved forward or backward.

The distribution of the pain varies, but it is, of course, generally about the point of the shoulder, although it may radiate down the arm to the insertion of the deltoid, and occasionally pain may shoot down to the finger-tips, thereby closely simulating the pain of neuritis. An acutely tender spot is often found just below the tip of the acromion and may extend to the bicipital groove. This painful spot is due to the inflamed bursa, which at this point is unprotected by bone. If it is possible to abduct the arm this tender spot disappears as the bursa is carried beneath the acromion, and this constitutes what is known as "Dawbarn's sign." An *x*-ray examination may show that the space between the acrominon and the head of the humerus is increased, for in health these parts are found to be closely approximated. Associated with the pain and the symptoms just described, the muscles about the shoulder-joint may undergo considerable wasting, either from disuse or, possibly, as the result of a reflex trophic effect such as is often seen in muscles which have to do with the movement of diseased joints in other parts of the body.

The causes of subacromial bursitis may be injury, some disorder of metabolism, such as rheumatism or gout, or the various

sources of infection that commonly produce articular trouble, such as gonorrhea, pyorrhea alveolaris, or any other local infection. When creaking is present on moving the joint it is probably due to a chronic bursitis and not to a true arthritis.

It is important to remember in regard to trauma as a factor in these cases that a very slight injury may be productive of these lesions, and furthermore that in some instances the patient is a sufferer not only from a bursitis but from a neuritis as well, which neuritis may also be due to injury, to gout, or to infection.

In the way of treatment it is of vital importance to discover some focus of infection elsewhere in the body, as in the teeth or in the urethra, and to remove such a focus, to regulate the diet, and to apply those remedial measures already referred to at the beginning of this article. Another point of vital importance, in the early stages of the bursitis or neuritis, when inflammation is present, is absolute rest of the part affected. The arm should be fixed by means of a Velpeau's bandage or in a splint, which in turn is fixed to the side of the body, but Codman suggests that, while this rest is essential, it is also well to fully abduct the arm. Such a position can only be maintained if the patient is kept in bed. If the pain continues and is severe under rest the various remedies already named may be employed, or it may be that morphine will be needed. When the condition improves the arm should be kept in a sling so as to relieve the shoulder-joint of any weight, and after the pain has practically or entirely disappeared, gentle Swedish movements may be carried out, gradually increasing the area or arc through which the arm is moved. Massage should not be employed when acute pain or inflammation is present.

A very important point in connection with these cases is the conclusion, which has been arrived at by both Codman and Buckley, that operative measures are rarely if ever to be resorted to. Indeed, Codman apparently goes so far as to assert that it is meddlesome surgery to interfere unless the pain is exceptionally severe or the disability very great. Finally it is well in these cases to inform the patient that the condition is one which is difficult to relieve, and that weeks or months of active treatment may elapse before he is cured. Otherwise it is often difficult to persuade the patient to maintain the rest of the arm which is so essential to recovery.

CAUSATION, PREVENTION, AND CURE OF GOITRE, ENDEMIC AND EXOPHTHALMIC.

There is a generally accepted view to the effect that the cause of goitre is to be found in a toxin which may be, indeed probably is, of bacterial origin.

Farrant holds (*British Medical Journal*, July 18, 1914) that toxemias can be divided into three groups according to their action on the thyroid. The first group produces no effect; the second causes a colloid hyperplasia; and the third a complete or acute hyperplasia. The microscopical appearances of the colloid hyperplasia are indistinguishable from those of endemic goitre, whilst the complete hyperplasias are indistinguishable from exophthalmic goitre. No definite signs of hyperthyroidism are observed in cases affected with a single toxemia; neither are they seen in guinea-pigs after inoculation with two acute toxemias—the second being injected before recovery is complete from the first. But they are found when a subacute toxemia supervenes on a chronic one.

The object of Farrant's present paper is to record observations made on 85 cases of goitre (exclusive of simple hyperthyroidism) between 1909 and 1914 as to the relationship between toxemias and diseases of the thyroid; to prove that in cases in which the thyroid is diseased the etiological microorganism or toxemia can be determined; to show that not only in this way can diseases of the thyroid be cured but also prevented.

As to causation Farrant subdivides the microörganisms and toxemias into four groups according to situation. They are usually found in the mouth, lungs, or intes-

tines. As to the mouth a study of the cases at the dental clinic where the patients presented themselves for extraction showed signs of hyperthyroidism in about 7 per cent. These were mostly females between the ages of seventeen and thirty. The dominant symptoms were nervousness, with falling out of the hair and moistness of the palms of the hands, slight loss of weight, associated with tremor, tachycardia and slight prominence of one or both eyes, with or without general fulness or enlargement of the thyroid. These symptoms taken together show a typical picture of hyperthyroidism. As to the nose, the bacillus catarrhalis was frequently found, which on inoculation of guinea-pigs caused complete hyperplasia. In the normal nose of the normal individual with infection of the influenza bacillus there would be a transient thyroid hyperplasia. The gland would involute to normal soon after the subsidence of the toxemia. If the patient were already in a condition of hyperthyroidism from any other cause the fresh stimulus from the B. catarrhalis would lead to an exacerbation of the hyperthyroidism.

As to the lungs Farrant states that he has already shown that miliary tuberculosis causes complete hyperplasia, whilst a colloid hyperplasia is caused by chronic tuberculosis.

There is no evidence to show that the products of intestinal putrefaction have any action on the thyroid.

As to the microörganisms infecting the intestinal tract, it has been shown that some organism living in the alimentary canal of an infected individual gives rise to thyroid enlargements. McCarrison produced goitre in goats by giving them water contaminated with the feces of goitrous people and by feeding them with cultures of the organisms grown on agar. He obtained the same results by using the feces of non-goitrous people.

It is held that endemic goitre, whether it occur in isolated habitations or in goitrous districts, is caused in man by the chronic ingestion of organisms of the B. coli group, which undergo mutation, some members of the mutants causing colloid hyperplasia of the thyroid with enlargement and no signs of hyperthyroidism. It is suggested that some of the varieties may produce a toxin capable of further stimulating the thyroid to a condition of complete hyperplasia accompanied by signs of hyperthyroidism.

Diseases of the thyroid are divided into two groups: (*a*) Those in which the most prominent feature is hyperthyroidism (exophthalmic goitre type); (*b*) those in which the most prominent feature is thyroid enlargement (endemic goitre type).

The prevention of exophathalmic goitre depends entirely on the recognition of the first stage—the early condition of hyperthyroidism. The presence of this is usually marked by the occurrence of nervousness, followed by falling out of the hair, sweating, and slight loss of weight; examination reveals all the signs of exophthalmic goitre in a minor degree; its detection necessitates examination of the skin, hair, and sweat glands, of the muscular tone, the sympathetic nerves, and the cardiovascular system. The cases are to be found amongst those diagnosed as pyorrhea, dyspepsia, early osteoarthritis, chronic rhinitis, tuberculosis, cirrhosis of the liver, and chronic interstitial nephritis, the last two being of interest rather than of importance. In these cases the infection and its results are more prominent than the signs of thyroid excess. The cases are also to be found amongst the following, in which one symptom of thyroid excess is more prominent than the other: Hyperidrosis,. alopecia, urticaria scripta, tachycardia, myocarditis, hysteria, and exophthalmia. These cases come under notice, not only in general practice, but also in the special departments. When a diagnosis is made, the case becomes a bacteriological study; both the nature and the focus of the infecting microörganisms are to be found. A methodical examination should be undertaken, the history of any past illness elicited, and the date of onset of each noted.

The date of onset of the symptom of thyroid excess should be compared with the date of the occurrence of the toxemias. In

this way a connection between the toxemia and the hyperthyroidism can often be elicited. An examination of the mouth, nose, lungs, etc., must be carried out for the site of the infection, and swabs and cultures to find the exciting microörganisms. In those cases in which the microorganisms have been constantly swallowed a bacteriological examination of the feces should be made to find if the organisms have become indigenous in the intestine. When the exciting microörganism and its site have been determined, means should be undertaken for its removal. Some minor surgical operations, such as teeth extraction, submucous resection of the nasal septum, removal of the nasal polypi, may suffice to cure the condition, accompanied in appropriate cases with intestinal antiseptics such as thymol. In the cases that have been so treated the symptoms entirely disappeared in about six months; no intestinal antiseptics were used, as it was necessary to determine the exact connection between the toxemia and the hyperthyroidism without the intervention of drugs. It may be as well to state that because carious teeth or a deviated septum happen to be present it is not sufficient to at once ascribe the cause to them. Only about 7 per cent of cases of dental caries exhibit such symptoms. With a deflected septum there must be a very definite history of constantly recurring infection. It is also as well to remember that owing to the general vasodilatation all the mucous surfaces are flushed. Enlarged tonsils are but an effect, a part of the disease.

As to the cure, goitre diseases of the thyroid are separated into two groups: (*a*) Those associated with signs of excessive secretion; (*b*) those associated simply with enlargement of the gland.

In group (*a*) are those cases that have advanced beyond the stage of hyperthyroidism to that of the formes frustes and of typical exophthalmic goitre. The question arises, Can the gland retrace its steps after the removal of the causative toxemias and involute to normal, and can those organs that have been affected by the excessive secretion do the same? When a comparison is made between the microscopical appearance of a normal gland and that of exophthalmic goitre one is struck by the enormous cell increase that has taken place. In the solidification of the vesicles there are nearly ten times as many cells per vesicle; the vesicles themselves are also increased in number, so that when the gland is doubled in size the secreting area is increased some forty times. Involution to normal thus necessitates a reduction in the secreting cells to 1/40. It may be deduced from the length of time taken for the symptoms of thyroid excess to disappear in the cases of simple hyperthyroidism that complete involution of the gland and the disappearance of the symptoms in exophthalmic goitre would take over six months. Any incidental toxemia acting as a fresh stimulus would lead to a recurrence, the extent and duration of which would depend on the intensity and duration of the toxemia.

The treatment adopted and the results obtained necessarily varied with the nature and the situation of the infecting microorganisms. The most striking results were obtained in the very acute cases in which the infecting process could be completely removed.

The author concludes this valuable, though not entirely convincing, paper as follows: Endemic goitre is caused by the toxins from the atypical forms of B. coli. The mutants are usually conveyed by water. They become indigenous in the intestine, and different mutants of B. coli are to be found in the feces of cases of endemic goitre. The mutants are but rarely present in the feces of normal individuals or in the feces of individuals goitrous from other causes. It is possible to conceive circumstances which place the B. coli under abnormal conditions in the intestine itself, and lead to mutation and the temporary appearance of mutants in the feces of normal individuals.

The mutants set up an apyrexial toxemia, which stimulates the thyroid, so leading to a colloid hyperplasia and eventually to enlargement of the gland.

The whole process can be imitated in the laboratory, and endemic goitre induced in guinea-pigs by feeding with small doses of the mutants.

The supervention of a fresh toxemia whilst the gland is in a hyperactive state causes a complete hyperplasia, with absorption of colloid and signs of hyperthyroidism up to a condition of exophthalmic goitre. This is dependent on the intensity and duration of the fresh toxemia.

Endemic goitre is preventable by the avoidance of water contamination and by the sterilization of contaminated water.

It can be cured by the administration of intestinal antiseptics; the gland returns to normal, providing no degeneration has taken place. The gland as a whole involutes to normal, but the adenomata or cysts are left.

A condition similar to endemic goitre can be caused by other toxemias capable of inducing a colloid hyperplasia.

Exophthalmic goitre is due to a combination of toxemias of an intensity sufficient to cause a hyperplasia with absorption of the colloid material. One acts during a period sufficient to give rise to a complete hyperplasia, associated perhaps with slightly marked signs of hyperthyroidism without necessarily any glandular enlargement. The supervention of another infection stimulates the gland, which usually enlarges, and the signs of hyperthyroidism become very evident; the case develops into one of typical exophthalmic goitre. A nervous shock may lead to the diagnosis by suddenly bringing into evidence the symptoms of hyperthyroidism, especially those connected with the nervous system.

The severity and duration of exophthalmic goitre are dependent on the intensity and duration of the toxemias. If they be of short duration the disease will disappear in a few months.

Exophthalmic goitre can be prevented by the detection of the early cases of hyperthyroidism and the consequent removal of the basal toxemia.

Exophthalmic goitre can be cured if the causative agents be removed before degeneration has occurred either in the gland or in those organs that are affected by the hypersecretion.

When degeneration has taken place in the thyroid, removal of the toxemias causes involution to take place only in the hypertrophied portion; the adenomata and cysts are left. These require appropriate surgical treatment, as they to a certain extent keep up the symptoms of thyroid excess. Surgical treatment without removal of the cause is followed by recurrence unless so much of the gland substance has been removed that hypersecretion is impossible. Degeneration in the other organs partially recovers after involution of the thyroid; appropriate treatment is necessary for those that remain. Acute cases of exophthalmic goitre may present themselves in which surgical treatment is the only means of saving them, though the risk of death under the anesthetic perhaps precludes operation.

COMPLEMENT FIXATION AND GONOCOCCUS INFECTIONS.

The importance of demonstrating the presence or absence of the gonococcal infection, not only from the standpoint of the patient himself, but from that of public health, is generally recognized. It is also, unfortunately, true that even by the most searching methods of investigation of discharge, if such exist, the gonococci may escape detection. Hence the profession has been eagerly awaiting a method of diagnosis upon which a fair degree of dependence could be placed and which in itself would not be so technically difficult as to make it inapplicable for general use.

It is particularly regarding the complement fixation that most hope has been excited. The reports as to its reliability have been so conflicting that the whole question so far as the profession at large is concerned may be regarded as *sub judice*. It therefore happens that Kolmer and Brown's study (*Journal of Infectious Diseases*, July, 1914) is peculiarly timely and serviceable. Whilst acknowledging that in no instance have results been secured comparable to the diagnostic value of the syphilis

reaction, they hold that this is due probably to the fact that syphilis quickly becomes a general infection with a resulting extensive antibody formation, and the antibody of the treponema pallidum, or at least the more prominent of two possible antibodies, is characterized by its great affinity for lipoids in tissue extracts—this peculiar lipoidophilic antibody or reagent being found with any degree of constancy in only two other infections, frambesia and leprosy. Pure culture antigens of the treponema pallidum have not the same value in the syphilis reaction as the ordinary lipoidal extracts, and results in the serum diagnosis of syphilis with these culture antigens are comparable in their inconstancy and weakness to reactions in other infectious diseases with their specific culture antigens, including the gonococcus complement fixation test.

Muller and Oppenheim in 1906 first applied the complement fixation test in gonorrheal arthritis, using the culture of the gonococcus as antigen. Meakins was the first in America to apply this test. Later Schwartz and McNeal emphasized the necessity of using polyvalent antigens. They showed that strong reaction was not to be expected before the fourth week of infection, and then only in acute cases with complications. A negative reaction did not exclude gonococcus infection. They secured positive reactions in a certain number of cases, especially where the bacteriological investigations failed to show gonococci.

Since the quantity of antibody formed in a strictly local gonococcus infection is probably small because of the comparatively slight cellular involvement, the complement fixation reactions are generally weak and consequently require the closest technical attention, especially in the preparation of antigen and in the accurate adjustment of the hemolytic system. There can be no doubt of the truth of the contentions of Teague and Torrey, Schwartz and McNeal, that the more polyvalent the antigen the more satisfactory the complement fixation tests.

The question of the rôle of secondary infection in chronic gonococcus infections of the genito-urinary tract is one of much interest. One of the authors has isolated a large number of cultures of staphylococci, streptococci, diphtheroid bacilli, etc., from cases of chronic urethritis and prostatitis, prepared antigens of these organisms, and used them with all sera in an endeavor to determine their etiological relationship to these chronic processes, in so far as this could be done by complement fixation reactions with homologous and mixed antigens.

Since the gonococcus, meningococcus, and the micrococcus catarrhalis possess morphological and biological characters in common, a study of their biological relationship by complement fixation reactions with their various immune sera and antigens is of distinct importance, as it has a direct bearing on the specificity of the gonococcus fixation test.

The objects of the study were mainly fourfold: (1) To ascertain the practical value of gonococcus antigen prepared after various methods; (2) to study the relation of mixed infection to chronic gonococcus infections of the genito-urinary tract by complement fixation experiments with antigens of the organisms commonly found in mixed infections; (3) to study the practical value of the gonococcus fixation test in so far as it could be done with the material used in their investigations; (4) to study the biological relationship of the gonococcus to the meningococcus and the micrococcus catarrhalis by means of complement fixation tests.

The difficulty of isolating and preserving a sufficient number of cultures of real gonococci in order to prepare a satisfactory polyvalent antigen constitutes a weighty drawback in the practical use of the gonococcus complement fixation test.

In the majority of reactions the amount of complement fixation was much less than that commonly occurring in syphilis. Hence the reactions were not so satisfactory as the majority of syphilis reactions, and the readings were more difficult.

Because of the small amount of gonococcus antibody present in the majority of

cases, unless accompanied by unusual complications, the technique of the test, and particularly the adjustment of the hemolytic system, required considerable care in order to secure the best results.

In a comparative study of a number of sera tested with both the antisheep and antihuman hemolytic systems slightly better results were secured with the latter. In using the antihuman system exactly the same technique was employed as with the antisheep system, except that two hemolytic doses of hemolysin were used instead of one. In both, inactivated sera were used. The stronger reactions with the antihuman system showed the probable influence of natural antisheep hemolysin in human sera, when an antisheep system is employed.

In 52.6 per cent of cases the results were the same with both systems; in three cases, or 15.6 per cent, the reactions were slightly positive, and one other was stronger with the antihuman and negative or weaker with the antisheep system; in one case the reaction was negative, and in three others weaker with the antihuman, and positive or stronger with the antisheep system. Thus with the antihuman system slightly better results were secured. This was further supported by a similar set of comparative reactions with sera from which the natural antisheep hemolysin had been removed.

The authors summarize an admirable piece of work as follows:

About 60 per cent of all cases of gonococcus infections reacted positively in the gonococcus complement fixation test. In the few cases of pyosalpingitis examined, 66 per cent reacted positively. The highest percentage (83) of positive reactions occurred in cases of arthritis, considered clinically as possible gonococcus infections.

The gonococcus complement fixation test is of particular value in aiding the diagnosis of the nature of an obscure arthritis, in pelvic inflammatory diseases of women, in deciding whether or not a given case of urethral infection is cured or still harbors foci of living gonococci, and aiding in the diagnosis and management of vaginitis in female children.

The reactions are not generally as satisfactory as those occurring in the syphilis reaction because the quantity of gonococcus antibody is much smaller unless grave and wide-spread gonococcus metastases exist, and the fixation of complement by bacterial amboceptor and antigen is not so marked as that occurring with syphilis reagin and a lipoidal extract.

In a comparative study of a number of sera tested with both the antisheep and antihuman hemolytic systems, slightly better results were secured with the latter.

To be of any value gonococcus antigens must be polyvalent. An antigen composed of a simple suspension of organisms in saline solution yielded 11 per cent better reactions than filtrates. It appears that the bacterial protein, aside from the endotoxins, aids in the antigenic effect. Alcoholic extracts of gonococci possess little or no value.

The occurrence of positive reactions in about 9 per cent of cases of chronic gonococcus infections with antigens of staphylococci, streptococci and diphtheroid bacilli, indicates the active rôle these organisms may assume in these infections. The occurrence of about 5 per cent positive reactions with an antigen of the micrococcus catarrhalis would indicate that this organism may be likewise active in chronic urethritis.

A study of antigonococcus and antimeningococcus sera with antigens of gonococci and meningococci, indicates the close biological relationship of the gonococcus and meningococcus, and while their respective amboceptors are most specific for their own antigens, in lower dilutions this specificity is not so apparent and the results constitute another example of "group" reaction similar to those occurring with the group of streptococci, diphtheria bacilli, spirochætæ, etc.

The busy practitioner after a perusal of this article must still feel that while the laboratories offer him valuable assistance in certain cases they are not in position to afford him a reliable test as to the presence or absence of gonococcic infection.

REPORTS ON THERAPEUTIC PROGRESS.

THE VALUE OF THE LUETIN REACTION.

Stimulated by von Pirquet's discovery of a specific cutaneous reaction for tuberculosis, attempts were made by various workers to obtain extracts from syphilitic tissues which might give a similar type of reaction with syphilitic patients. Extracts of syphilitic fetal liver, for example, were applied to the skin of such patients, but the results obtained by these methods were, on the whole, contradictory, and it was found that a similar type of reaction could be produced by using concentrated extracts of normal liver in the place of syphilitic extracts.

A fresh impetus to investigation in the direction was, however, given by the researches of Noguchi, who first demonstrated the possibility of obtaining the treponema pallidum in pure culture. By the employment of such cultures of the causative organism Noguchi was, in 1911, able to produce a substance, to which he gave the name of "luetin," which on inoculation in many cases of syphilis gave remarkable and interesting results. The technique of the preparation of this substance is given in Noguchi's original paper in the *Journal of Experimental Medicine,* but it may not be out of place briefly to recapitulate the salient features of its manufacture.

The cultures were made in ascitic fluid and ascitic fluid agar containing sterile placenta, and, after varying methods of growth up to fifty days, the solid media containing innumerable spirochætæ were ground up in a sterile mortar and fluid media added until a liquid emulsion was obtained. The preparation was then heated to 60° C., and 0.5-per-cent carbolic acid subsequently added to insure sterility. The method of application is simple. A drop of the emulsion is injected into the skin of the arm, while a drop of control emulsion, which has not been inoculated with spirochætæ, is injected into the opposite arm at a corresponding point. This control inoculation does not generally cause any reaction. In Noguchi's hands encouraging results were obtained, and the hope was entertained that a new and powerful weapon had been discovered to help in the accurate diagnosis of syphilitic infections.

Nearly three years have passed since the publication of Noguchi's original paper, and we are now in a position to appraise, to some extent, the merits and demerits of his technique as applied to diagnosis. In normal (non-syphilitic) cases the reaction is fairly constant. After some twenty-four hours a small erythematous area is visible in and around the seat of inoculation; the reaction receding within forty-eight hours without leaving subsequent induration, and with such normal cases constitutional effects are conspicuously absent. The reaction in syphilitic cases is sometimes positive and sometimes negative. The positive reaction varies in intensity, and may be classified as "papular," or "torpid." In the papular form the inflammatory process commences in from twenty-four to forty-eight hours, within which time a raised, reddish, indurated papule makes its appearance. The induration increases slowly during the following three or four days, then commences to recede and completely disappears within a week. In the pustular form, which is commonly observed in cases of tertiary syphilis, central softening commences about the third or fourth day, the original papule passing through vesicular and pustular stages. The pustule, on breaking, presents indurated margins, which disappear after a few days. In the torpid form the reaction appears at first to be negative, but after some ten days it lights up and a pustular stage supervenes. As a general rule, constitutional effects following inoculation are slight and a small rise of temperature is the only indication observed. General malaise, loss of appetite, and diarrhea have, however, been noted in the earlier experimental work with luetin, but with the more recent employment of

purer luetin in much smaller doses only very slight constitutional reactions have been noticed.

In the report of Wolfsohn in the *Journal of the American Medical Association* for June, 1913, an interesting analysis of the use of luetin in a hundred cases of syphilitic affections is given, and in conjunction with the results obtained by other workers in America and on the Continent the following facts appear to be more or less fully established: The reaction is probably specific, and if positive, syphilis may reasonably be suspected. The reaction is present in the majority of cases of tertiary latent and hereditary syphilis and in parasyphilitic affections, such as tabes dorsalis and general paralysis; it is less constant in secondary untreated cases, and generally absent in primary cases. Treatment with salvarsan in the earlier stages of the disease appears to favor the production of a positive reaction, but intensive antisyphilitic treatment in the latter stages of the disease may produce a negative reaction; after an interval, during which treatment is suspended, the reaction may become positive. Particular attention is called by writers to the fact that tertiary cases giving a negative Wassermann reaction often react positively to the luetin test, and claims have been advanced that in this type of cases the luetin reaction will prove to be of great value.

It should be observed that the Wassermann reaction is more constantly present in primary and secondary cases, while the luetin reaction is more in evidence in tertiary and latent cases, so that the two reactions to some extent complement each other. It is, however, in early untreated cases, in which the Wassermann reaction itself is usually absent, that a simple and reliable method of investigation would be of inestimable value. It is here unfortunately that the luetin reaction fails to give reliable information, and is, in fact, of less diagnostic value than the Wassermann reaction. The technique of the former test is, moreover, somewhat complicated, and a considerable familiarity with the reaction is needed to avoid pitfalls and to reach satisfactory conclusions. In the present state of our knowledge of syphilis the greatest aid to early diagnosis consists in direct examination for spirochætæ by the dark-ground illumination method in preparations of irritation serum from suspected syphilitic lesions. The serum is obtained from the deeper layers of the lesion, avoiding surface contamination. The lesions are carefully cleaned with pledgets of cotton-wool soaked in sterile salt solution, and then scraped with a dull curette, thus inducing a ready flow of serum. Such direct examination is by no means difficult, and comes well within the purview of the modern physician, while the Wassermann reaction does not exact any technical knowledge on the part of the practitioner beyond the procuring of blood samples for expert examination. From these considerations it does not appear to be probable that the luetin test will ever supersede either of these alternative methods, though, no doubt, in certain cases of tertiary and latent syphilis the method will prove useful, when employed by skilled hands, in clearing up an obscure diagnosis.—*British Medical Journal,* May 16, 1914.

SUMMARY OF RESULTS FROM 600 INTRAVENOUS INJECTIONS OF NEOSALVARSAN.

The *Journal of the Michigan State Medical Society* for August, 1914, contains an article by HOLMES in which he says that judging from the result of these six hundred injections, it seems justifiable to draw the following conclusions:

1. The intravenous administration of neosalvarsan in selected cases is without danger.

2. Danger is minimized by the method making sure of a concentrated hypertonic solution.

3. Danger is minimized by keeping the patient under hospital supervision while undergoing treatment.

4. In the absence of a large number of spirochætæ, a certain amount of reaction is

inevitable after the first injection. This reaction is of no importance.

5. A reaction of sensitization is excited in a smaller number of cases.

6. The small number of untoward results is due to care in selecting cases, proper dosage and asepsis in administration.

7. While neosalvarsan has not proved as potent as old salvarsan, it is highly efficient and may be used more often and in larger doses.

MEDICAL VERSUS SURGICAL TREATMENT OF PYLORIC STENOSIS IN INFANCY.

HOLT contributes a valuable paper upon this condition to the *Journal of the American Medical Association* of June 27, 1914. He asks and answers the question: Given a fairly definite case of pyloric stenosis in an infant a few weeks old, what treatment shall be advised? At present the profession is by no means in agreement regarding this point. Even among those who have had a large experience with pyloric stenosis a wide divergence of view exists. Physicians have reported quite large series of cases treated by medical measures alone with so low a mortality as to lead to the inference that nearly all these patients recover if properly treated, without resort to surgery. Thus, Robert Hutchison in England reports, in twenty cases treated in private practice, eighteen recoveries. German writers, Heubner, Bendix, Starck, and others, also give about the same proportion of recoveries in series of cases treated without operation.

On the other hand, quite an opposite view is taken by surgeons. They consider the disease a surgical one, and urge that the patient be turned over to them for operation, as soon as the diagnosis is made. They argue that medical treatment in a very large number, probably in most instances, is only a waste of time and that the life of the patient is often jeopardized because the surgeon does not see the case until the general condition has become very grave, while with earlier operation nearly all could be saved. In a recent publication Richter of Chicago reports twenty-two operations with but four deaths.

Pyloric stenosis in infancy is accredited with a general mortality of about 50 per cent, if we accept the reports of those who have written most widely on the subject. Of the 57 cases in his series there were 26 recoveries and 31 deaths, a mortality of 55 per cent. There were operated on 28 patients, with 14 deaths; treated medically 29 patients, with 17 deaths. It should be remembered, however, that three-fourths of these were hospital patients and that every case of pyloric stenosis admitted was included, though a considerable number were in so wretched a condition as to be hopeless, and four were practically moribund. The very bad cases were treated medically or operated on in about equal numbers.

To what is this difference of opinion due? Does it mean that with proper medical treatment surgery is unnecessary, or does it mean that different conditions have been considered by the different writers? In looking over case reports one is unable to see that there is any very great difference of opinion in regard to the symptoms essential for diagnosis. These are pretty well established, and there is very general agreement among both physicians and surgeons.

Some writers take the ground that cases of pylorospasm do not require operation, but that it may be necessary in cases of hypertrophic stenosis. If a child recovers without operation it is evident, they say, that the condition was one of pylorospasm only. This argument is not very convincing. Holt has already stated his belief that no sharp division of the case into spasmodic and hypertrophic is possible either on pathologic or on clinical grounds, and that a better practical division is into mild and severe types. In the former, improvement frequently begins in a few days when proper treatment is instituted, and recovery may follow in a few weeks. In the latter also there is a strong tendency to recover from the symptoms of obstruction, and Holt believes from the pathologic condition also; but the course is so protracted that, owing

to the tender age and feeble resistance of these patients, not a few succumb, although to use a Hibernianism, they would all get well if they lived long enough.

Against operations are the following considerations: A large number recover without it, and the essential surgical risks of operation, even in the best hands, are considerable.

The crux of the whole question between medical and surgical treatment of pyloric stenosis seems to Holt to be: Are the symptoms and conditions such as to make it probable that the patient will or will not live long enough for the pathologic condition to subside? There are medical risks and there are surgical risks; in the individual case one must decide which are greater; the two must be carefully weighed one over against the other.

The medical risks in an infant with pyloric stenosis are not to be ignored; they are, Holt thinks, not sufficiently considered.

First, there may be death from acute inanition; this in the most acute cases occurs quite rapidly. Holt has seen a number of cases with such prostration and so rapid a loss in weight that delay in operation even of a few days would, Holt believes, have cost the child its life.

Second, there is the danger of marasmus or slow inanition from the prolonged duration of the symptoms. While this risk is not so great in private practice, it exists, and in hospital practice and also among patients in poor surroundings it is very serious. The problem is one of infant nutrition with a very heavy handicap, and the difficulties are at our command. There are considerable risks in waiting day after day and sometimes week after week when a child is barely holding his weight or losing but one or two ounces a week. The physician frequently does not realize on what thin ice he is skating, and how near the danger-line he is. Especially is this likely to be the case if the vomiting has become infrequent and fecal stools are present. It is hard to estimate how much resistance these little patients have. To allow the weight to fall gradually from 8 pounds to 7, to 6, or even lower, is to take great chances; and although possibly the majority of the patients may recover, every now and then an unexpected death occurs without warning.

Third, there is the risk of intercurrent disease developing while a child is in a greatly enfeebled condition. This is a very important consideration in a hospital where treatment must usually be continued from six to ten weeks, and it has some weight even in private practice.

Fourth, there is the risk of sudden death, which may come without any assignable cause. It has happened two or three times in Holt's experience that children who seemed to be doing fairly well have collapsed suddenly and died in a few hours, the necropsy giving no explanation. This has occurred when the food taken seemed adequate so far as its caloric value was concerned, when the weight was stationary or showed only an insignificant loss, and when the vomiting had practically ceased.

One other question deserves some consideration in this connection, namely, if these patients get well without operation do they recover completely or does a lesion remain which may subsequently give trouble?

During the last few weeks Holt has either seen personally or had reliable reports from seven patients who were under his observation during infancy with typical pyloric stenosis and who recovered without operation. One, a boy of nine, has had no gastric symptoms since he recovered from his attack, and is the most robust member of a family of four children. A second is now seven years old; he had to be fed carefully during the first few years, but for two years past he has "eaten everything" and has had no digestive symptoms. A third, whose active symptoms lasted until he was eight months old, whose weight at seven months was but 7¼ pounds, and whose pyloric tumor was noted as late as the seventh month, was, at 5¼ years, a husky boy weighing 60 pounds. There had been no gastric symptoms since he left the hospital at nine months of age. The same was

true of three others seen, whose ages were 4½ and 3½ years, respectively. None had had gastric symptoms since infancy; all were well developed, and two were robust. A report from another child, seventeen months old, tells that his weight was 30 pounds, and that he had been absolutely free from symptoms since he left the hospital at the age of 3½ months. These include all the cases of recovery from pyloric stenosis without operation which Holt has been able to follow. In no instance was there a persistence of symptoms into childhood. After these children recovered from their malnutrition their subsequent progress and development was quite up to the average. The period of malnutrition lasted in most of them until they were nearly a year old, and in some it persisted well into the second year.

Is there any evidence that subsequent trouble does not occur in later childhood in these patients? We know that hypertrophy disappears slowly, and we have abundant proof that the cessation of symptoms does not mean that hypertrophy no longer exists. Howland found a typical hypertrophic tumor still present in a child who died of acute diarrhea four months after recovery from symptoms of pyloric stenosis. A patient operated on by Downes at the Babies' Hospital died of diphtheria six months after gastroenterostomy; hypertrophy of the pylorus still existed. Morse also has reported a similar case; the child recovered from operation (gastroenterostomy), but died of acute disease six and one-half months later; the necropsy showed that the pyloric tumor and the obstruction persisted.

Pyloric stenosis in infancy was long overlooked, and possibly, as Graham suggests, we are still overlooking pyloric stenosis of later childhood. He reports a case of pyloric stenosis in a child of 6½ years and cites many others from literature which were proved by necropsy. How often these cases occur, or in what proportion of the patients with pyloric stenosis in infancy these late symptoms follow, we are as yet unable to say. Evidence that they suffered from symptoms of pyloric stenosis in infancy is wanting. Holt has seen but one case of pyloric stenosis in an older child, a girl of 4½ years; but there was no history of protracted vomiting in infancy, and definite gastric symptoms did not begin until the patient was three years old.

A connection between the pyloric stools of childhood and those of infancy has been assumed. It is yet to be established that they have the same pathologic basis. The final word on this subject has not yet been spoken, and it may be that further experience may cause us to revise our opinion regarding the ultimate outcome of the cases of pyloric stenosis in which recovery occurs without operation. At present the evidence is that patients who get well without operation recover completely.

The surgical risks in operations for pyloric stenosis are partly essential and partly accidental. The essential risks are those of shock, of non-union because of the child's poor nutrition, and the danger of exhaustion owing to the fact that the difficulties of feeding have not been altogether removed by the operation. These dangers exist in every case no matter how experienced the surgeon. Of much greater importance are the accidental risks largely due to faulty technique; these are of course greatly lessened by experience on the part of the operator. Then there are the risks of hemorrhage, of leakage, of obstruction, of infection, and other accidents which may follow any abdominal operation. On the whole, it is Holt's belief that the medical risks, particularly in hospital patients, have not been sufficiently considered and that the surgical risks have been exaggerated. With an operator experienced in these cases and a patient in fair condition, the operative risk is much less than one would anticipate. It is to him, Holt asserts, a constant surprise to see in these patients how small is the amount of shock of an abdominal operation which rarely lasts less than forty or forty-five minutes. The younger the infants the less the shock appears to be, which perhaps is not to be wondered at when we remember what prolonged opera-

tions can be done on a new-born infant with little or no shock.

In private practice, if the best environment, good nursing and proper medical attention can be commanded, Holt believes that the risks of the medical treatment are small and that very many patients will recover without operation. But there will, Holt believes, be always a certain number of patients for whom surgical intervention will be required. The favorable conditions such as he has mentioned in private practice can be obtained for only a small proportion of the patients with pyloric stenosis. For the others, if the symptoms are severe, Holt thinks early operation offers more chances of recovery. Even if the surgical risks are considerable they are short, while the medical risks are prolonged and the dangers multiply with the duration of the symptoms.

An early diagnosis adds much to the chances of success by any method of treatment. In some cases the symptoms have lasted so long and the condition is so critical in consequence of the rapid loss in weight that immediate operation should be advised as offering the only chance of recovery. Under other circumstances every child should have the benefit of a fair trial with medical treatment. The duration of this in hospital practice will depend on the conditions present. If the symptoms are severe, a day or two may suffice; if less acute, a delay of a week or ten days may be permitted. Operation should be done not because a case is classed as spasmodic or as hypertrophic, but because mechanical obstruction of a dangerous degree exists, whatever its suspected nature.

The indications for operative interference are (1) no diminution of the vomiting or the gastric peristalsis by stomach washing and diet; (2) a steady loss of weight of from one to two ounces a day; (3) marked gastric retention; and (4) absence of fecal stools. The presence of a tumor Holt does not regard as essential.

His early personal experience led him strongly to favor the medical treatment of these cases. He was greatly influenced by two or three very conspicuous successes in patients treated without operation, and also by the results of the first seven cases in which he saw operation done, five of the seven having been fatal.

Increased experience, however, has shown that the average case medically treated, unless it shows improvement almost at once, is likely to run a very prolonged course even though the child may ultimately recover. From six to twelve weeks of continuous treatment have usually been found necessary in the cases he has seen. This is in marked contrast to the rapid improvement which has taken place in all the children who have recovered after operation.

In looking over the histories of the patients observed during the past six years, Holt finds that in a constantly increasing number he has advised early surgical interference. His greatest regret in that review is that operation was delayed in so many and in some not done at all. In this connection it is interesting to note the length of life after admission to the hospital of patients not operated on. In fourteen such cases it was as follows: 69 days; 44 days; 24 days; 22 days; 17 days (two patients); 13 days; 10 days; 9 days; 6 days; 5 days; 3 days; and two moribund patients. Holt feels sure that with our present experience a very considerable number of these patients might have been saved. No doubt the technical skill which the surgeons have acquired in the operation has contributed much to these later results, but our experience in the management of the patients after operation has also been a factor of importance.

The postoperative treatment is very important. Emphasis should be laid on four points: hypodermoclysis, feeding, castor oil, and posture.

Hypodermoclysis is useful immediately before or after operation as a means of introducing water into the body. It is greatly to be preferred to the Murphy drip. Holt has employed a normal saline solution with 4-per-cent dextrose; of this from 100 to 200 Cc. are slowly introduced either be-

tween the shoulders or into the abdominal walls.

In feeding, breast-milk is indispensable. They begin food as soon as the child has fairly recovered from his anesthetic, or about four hours after operation; giving two teaspoonfuls of breast-milk every two hours, alternating this with two teaspoonfuls of boiled water. On the following day the interval is made three hours, and the milk and water are each increased to ½ ounce. At the end of forty-eight hours, 1 ounce of breast-milk is given every three hours, alternating with 1 ounce of water. By the end of a week the child is usually taking from 2 to 3 ounces of pumped breast-milk every three hours alternating with boiled water. By the tenth or twelfth day in most cases the child is put to the breast, but the amount of milk allowed is limited for the next week or two.

A teaspoonful of castor oil is administered at the end of thirty-six hours, and is usually followed by free evacuation from the bowels, which in many cases have not been freely moved up to that time.

The child's bed is inclined at an angle of about 135 degrees or more, the head being raised. This posture facilitates the expulsion of gas from the stomach and greatly diminishes the chances of vomiting. The child is usually kept in this position for four or five days.

Whether in a given case we shall decide in favor of operation or medical treatment will then depend largely on the severity of the symptoms and the conditions under which the child is seen. To subject every infant with pyloric stenosis to so serious an operation as laparotomy for a condition in which at a low estimate 50 per cent recover without it, seems hardly justifiable. Holt believes it to be a mistake to turn every case over to the surgeon as soon as the diagnosis is made, as some would have us do. On the other hand, the position taken by Hutchison, that "operation is never under any circumstances justified" in these cases is, he believes, untenable. Holt does not think that the physician realizes how well these patients do surgically, or that the surgeon appreciates how many of them recover when treated medically.

Given an early diagnosis, a patient in private practice under conditions which make the best medical treatment possible, operation may not in most cases be required; but in hospital practice, in cases seen late, in those with the most acute symptoms who are losing rapidly, and when circumstances do not admit of the best medical treatment, there is no question in Holt's mind but that immediate resort to surgery offers a better chance of recovery. Again, to persist with medical treatment week after week when forcible vomiting and marked peristalsis are either continually present or keep recurring, when the weight shows only a slight loss, seems to Holt to be incurring far greater risks with the child than those of operation.

The medical treatment for patients not operated on consists in careful feeding and stomach-washing. The gastric lavage should be practiced twice a day; it serves the purpose of emptying the stomach thoroughly of mucus and fermented food; the water should be used warmer than usual—that is, up to 112° F. If it can be secured, breast-milk is the preferable food, but one not rich in fat is essential. The common practice of weaning as soon as symptoms develop is most unwise. In default of breast-milk a modified milk mixture low in fat should be employed.

With respect to quantities and intervals of feeding, cases respond differently. Holt has usually depended on from one to three ounces at three- or four-hour intervals, water being given in small quantities—that is, ½ ounce every hour, especially if the food is breast-milk. In greatly prostrated patients hypodermoclysis may be used twice a day as described in the post-operative treatment. Rectal feeding is of little assistance except for a very short time. The bowels are moved readily by an enema, and the rectum does not discriminate between those things which are to be retained and those which are to be expelled. At most it is of assistance only for a day or two. Drugs Holt believes to be of

little or no value, nor can he say more for local applications of heat over the epigastrium as advised by many.

Every case of pyloric stenosis medically treated must be very closely watched; daily weights should be taken, as these children have a habit of slipping away unless the most careful observations are made.

Aspiration of the stomach to determine the degree and rate of emptying is of much assistance in deciding the frequency with which these children should be fed and the amount of food offered at one time. Its value is not appreciated.

INTRASPINAL INJECTIONS OF MAGNESIUM SULPHATE IN THE TREATMENT OF CHOREA.

The method of treatment which is now generally referred to as Marinesco's method was first suggested by the experimental and clinical work of Meltzer and Auer of New York. These investigators had shown that magnesium sulphate in intravenous, subcutaneous, and intraspinal injections, and in local applications to nerve trunks, inhibits the two chief properties of nerve tissue, namely, its excitability and conductivity. On the basis of their experimental work, Meltzer and Auer had suggested that the subarachnoid injections of magnesium sulphate might be employed with advantage as a substitute for cocaine in producing regional anesthesia. The first important therapeutic application of this method was in the treatment of tetanus. At the present time favorable results from this mode of treatment are being reported from various clinics abroad. Marinesco demonstrated the good effects of magnesium sulphate when injected into the subarachnoid space in sciatica and in the gastric crises and the lightning pains of tabes, and later applied this method in the treatment of Sydenham's chorea. In 1908 he reported four cases of the latter disease successfully treated by means of the intraspinal injections of magnesium sulphate. Since that time similarly favorable results have been reported by Baduel, Rocaz, and others.

The most recent contribution to this subject is that presented by Augusto Natali in the *Revista Ospedaliera,* March 31, 1914. He employed the so-called Marinesco method in the treatment of eight severe cases of chorea, one of which was a chronic case in an adult. The technique consisted in the performance of lumbar puncture in the usual manner, the evacuation of a certain amount of the cerebrospinal fluid, and the injection of a solution of magnesium sulphate. The strength of the latter varied from 7 to 26 per cent and the amount injected consisted of one cubic centimeter for every 25 pounds of body weight. Of the author's eight cases, following the first injection, there was a rapid improvement in two cases, an appreciable improvement in two cases, and a slow improvement in two others. No benefit was derived in the two remaining cases, which included one instance of the chronic type of the disease. The importance of these results is revealed by the fact that all of the cases were severe ones, and had failed to respond to the usual methods of treatment. Natali points out that it is of advantage to follow the intraspinal treatment by means of a brief course of arsenical medication. As regards the rationale of the action of the magnesium sulphate, Natali is probably correct in stating that this drug acts not as a specific but merely as a symptomatic remedy, diminishing the excitability of the nerve centers.—*Medical Record,* June 6, 1914.

PITUITRIN IN LABOR.

Writing to the *British Medical Journal* of May 2, 1914, HUGHES states that the interesting account in the issue of the *British Medical Journal* of April 25, 1914, by Dr. P. A. Hendley, of his use of pituitrin, needs both qualifying and supplementing. The statements that follow are based on a personal use of this agent in close upon 50 cases of normal labor during the past eighteen months. Without doubt, pituitrin is a most valuable help to both patient and doctor in such cases. Labor is considerably shortened, the use of forceps is usually

obviated, chloroform can be given without failure of uterine contractions, and stillbirths need not be anticipated. In his cases only one stillbirth has occurred. In this case (a primipara) the child lived up to the time the head was born; the placenta was large and thickly studded with yellow nodules. The father was under treatment for syphilis. Hughes could attribute the death to some cause connected with syphilis, not to pituitrin. In the majority of cases the children have behaved quite normally on delivery, but in some cases he has observed a curious rigidity of muscles, including those of respiration, which passed off quickly and without struggle.

Dr. Hughes states that Dr. Hendley entirely omits to mention the state of the cervix after delivery in his cases, and his practice of giving a considerable dose of pituitrin (0.75 to 1 Cc.) while the os is small is not justified in the present state of our knowledge. Thus, a multipara with her sixth child had uterine inertia. Owing to the entire absence of expulsive effort for some hours, the head, though normally presenting, had retreated to a little below the pelvic brim. The cervix was intact and patulous, and believing that two or three forcible pains might finish the first stage, Hughes gave her 1 Cc. of pituitrin. Labor was completed within one minute and a half. His pleasure at this astonishingly quick result was decidedly dampened on finding a pretty extensive laceration of the cervix on one side.

The effect, indeed, of pituitrin on the duration of a normal labor can only be guessed, not accurately calculated. His practice is now in a primipara to wait till the end or very nearly the end of the first stage, and with a multipara to test the cervix during a pain to make sure it is not rigid but yielding easily, before giving pituitrin. If these precautions are not observed there is an obvious risk of leaving the woman with a lacerated cervix. Again, in obstructed labor—for example, in moderately contracted pelvis—the principle of forcing the head onward by any such means is radically unsound. This is amply proved by recent statistics of the Rotunda Hospital, Dublin, concerning the effect of the use and non-use of forceps in contracted pelvis.

In less than one minute after a full dose of pituitrin the uterus goes into continuous contraction. After about ten minutes remissions between the contractions become increasingly evident, and in from thirty-five to forty-five minutes the effect of the first dose has passed off. Now if delivery occurs just after the effect of a dose has passed off there is a risk of postpartum hemorrhage. The uterine muscle is temporarily exhausted, and the organ gets "lost" under the hand with unpleasant frequency. For the same reason it may be troublesome to deliver the placenta. This particular contingency should therefore be avoided by giving a second dose in time, and not less than 0.5 Cc.

In conclusion, Hughes agrees that pituitrin infundibulum has a great future before it in obstetrics, and especially in uterine inertia.

THE USE OF SALVARSAN IN NON-SYPHILITIC DISEASES.

The *Journal of the American Medical Association* of August 1, 1914, contains an article by BEST in which he concludes that he is prejudiced in forming the following rules for the use of salvarsan in non-syphilitic diseases:

1. Salvarsan is specific in diseases caused by any variety of spirillum.

2. Salvarsan has curative properties in those diseases in which the infecting organisms are found in the blood or lymph, or in other locations where they can be easily reached.

3. Salvarsan has great therapeutic value in those diseases in which arsenic has been successfully used.

4. Salvarsan, if used with caution in repeated doses over a long period, has a therapeutic value in those diseases in which previously arsenic gave indifferent results.

5. Salvarsan, used as an adjuvant to some other drug or drugs, is useful in those diseases in which a decided and quick tonic,

stimulating and alterative effect is desired, depending on the other drug or drugs for the ultimate result.

6. The mode of administration is important, and should be as follows: intravenous in those diseases in which a specific action is desired; full dose intramuscular injections repeated once or twice at long intervals (eight weeks), in those cases in which the tonic, stimulating and alterative effect is desired, as well as a certain specific action; small, oft-repeated (week or ten days) doses, intramuscularly, over a long period of time, in those chronic diseases in which a purely tonic, stimulating and alterative effect is desired.

THE TREATMENT OF PHTHISIS BY INDUCED PNEUMOTHORAX.

Writing in the *Liverpool Medico-Chirurgical Journal* for July, 1914, RUNDLE tells us that twenty-one patients have received treatment by this method. The total number of injections given has been about 250. On no occasion has any complication of a serious character resulted from the operation. One patient was suffering from advanced disease of both lungs at the time of the first injection. The increased dyspnea resulting from the operation compelled the writer to abandon the treatment. Five patients with involvement of the greater part of one lung have been under treatment for from six to nine months. In these instances a cure is of course impossible, but it is noteworthy that in only one of them has there been any marked advancement in the physical signs since the beginning of the treatment. A fatal termination will eventually ensue, but the writer believes it to have been delayed. The improvement in this type of case has been accompanied by a very decided fall in the temperature range and volume of sputum. In one instance an obstinate and recurring hemoptysis appeared to be brought under control.

The remaining fifteen patients presented types of disease ranging in severity from the above to a moderate involvement of one lobe only. The extent of progress in these cases must always be largely a matter of opinion, but probably those who have followed the progress of the patients under treatment will agree that a greater and more sustained improvement has taken place than might have been expected as a result of treatment by other methods, not excepting the tuberculins.

The following are amongst the difficulties and dangers which may be met with:

The presence of adhesions making pneumothorax impossible. In such cases it is inadvisable to attempt to break down the adhesions by using pressure, although Saugman has recommended this. In one of the writer's cases nitrogen under pressure produced subdiaphragmatic emphysema which extended through the inguinal canal to the scrotum. During a second attempt the gas appeared along the great vessels of the neck, producing dysphagia by pressure upon the esophagus. If no free pleural space can be found, it is wiser to abandon the attempt.

Woodcock and others perform resection of the ribs in cases of this kind; the resulting collapse is then of course permanent. In view of the possibility of involvement of the other lung, it seems questionable whether one is justified in producing a final and total collapse of the affected lung. Evisceration of the lung is another expedient.

Faulty technique may produce pyopneumothorax, as in cases related by Brauer and Hammen. Cases of air embolism have been reported, but this danger should be obviated by a proper use of the manometer. Sudden death without obvious cause has been noted in more than one instance: this phenomenon is in keeping with that observed in rare instances as the result of such simple operations as tapping a hydrocele. As far as the writer is aware, no satisfactory explanation of this is forthcoming.

Dyspnea, with sometimes marked distress, follows the injection. In one of the writer's cases this condition was extreme, and necessitated drawing off a portion of the gas with an aspirator.

By far the greatest obstacle to treatment

has been, in the writer's experience, the pain incidental to the insertion of the needle. This pain is often most acute, it is not relieved by the use of the common local anodynes, and is at the maximum when the needle is piercing the pleura. Forlanini, in describing his method of simple puncture (the method the writer employs), states that it causes the patient very little pain, and that one may with good grace go on to make a number of punctures if the first be unsuccessful. The writer has not met a patient who would submit to this, and he believes that the proportion of individuals selected for treatment is restricted for this reason, rather than by consideration of the extent of the disease and clinical suitability. The fall of temperature and decrease in the amount of sputum, results which are fortunately within the observation of the patient, will often reconcile him to a prolonged course of treatment.

A local anesthetic to be of service must be deeply inserted, sufficiently to involve the pleura. This is in itself painful, and unfortunately deprives the patient of that sensation which is a very useful guide to the operator, when the needle is piercing the pleura.

In conclusion, the writer's feeling is that the induction of pneumothorax should not be undertaken as a routine treatment in—

First, very early cases with a favorable prognosis. In these the outlook is sufficiently good without subjecting the individual to the distress of a decidedly painful operation.

Secondly, very advanced cases, with involvement of both lungs. Here the writer believes that the additional dyspnea resulting from the lung collapse may materially hasten the end.

On the other hand, the writer is very strongly of the opinion that no case of phthisis of moderate severity should be allowed to progress to a fatal termination without a trial of this measure. By a case of moderate severity he means one of that type so familiar to us all, where, although the involvement of the lung is partial, and unilateral, there is a persistent daily pyrexia, with perhaps increasing emaciation, anorexia, copious sputum, and loss of weight. When a patient of this class has had the advantage of sanatorium treatment, without improvement, then the writer believes he is justified in boldly placing the treatment by artificial pneumothorax before his patient, as offering probably the only chance of arrest.

It is of historic interest to note that the first communication made to a learned society on the subject was that by Dr. James Carson of Liverpool, made a hundred years ago to the Royal Society, and to the Medical Society of Liverpool in 1821.

THE TREATMENT OF PERNICIOUS VOMITING OF PREGNANCY.

LYNCH, in the *Journal of the Michigan State Medical Society* for August, 1914, says that his studies have shown that the ammonia is absolutely increased as a rule in the more severe cases, although there are exceptions. Treatment, however, may cause variations. These cases therefore present the urinary features of acidosis. The writer has found, moreover, in contrast with Williams, acetone and diacetic acid in all his severe cases. In two instances the crystals of leucin and tyrosin were readily demonstrated in urine which had not been concentrated by evaporation. Nor does he attach the greatest importance to these findings, save as evidence of starvation. The ammonia coefficient has run high in his series and he has not viewed it with alarm, nor yet considered that it indicated the employment of abortion. Rather has he interpreted it as one of the many symptoms of acidosis in hyperemesis, and treated it accordingly. One of his most severe cases presented ammonia of normal amount (0.7 gramme with total nitrogen of 3.4 grammes) immediately before abortion and after many days' starvation. The toxemic feature was proved in this case by the onset of Korsakow's psychoses with subsequent peripheral neuritis of the Landry type, twelve days after abortion and at a time when danger was no longer apprehended.

As a result of his study the writer is impressed with the fact that there is doubtless a toxemic basis for all cases which deserve the diagnosis of hyperemesis gravidarum, while admitting that the hysterical element is paramount in many cases. Certainly no case which could be regarded as of the reflex type has as yet come to his observation, nor does the literature appear to him as warranting such distinction. If, therefore, prognosis and classification is impossible from the study of the ammonia and total nitrogen, we must consider all cases solely from the standpoint of their clinical symptoms until a proved index shall be described which will indicate liver insufficiency.

The symptoms of acidosis are urgent ones, and the acidity of the stomach is frequently high. Nor is the habit of vomiting easily controlled. The writer has not obtained good results from the employment of treatment usually recommended by obstetric texts. In his experience rest in bed and quiet is most important, together with the employment of large doses of bromide by the rectum, starting with 40 to 60 grains q. 4 h., as well as solutions of soda bicarbonate and of glucose. Nothing should be given by mouth for several days until the bromide has taken strong effect and the vomiting has ceased. Then the bromides may be cut down. Nearly all texts recommend liquid food by mouth, which in the writer's experience is useless. Stewards of ocean steamers have long known the uselessness of liquid food in the presence of nausea. Solid food, especially broiled meats, toast, and cream, will accomplish wonders. The combining power of the meat with marked stomach acidity should not be forgotten. Rectal alimentation is of extremely doubtful value, and may produce irritation of the gut, which will prevent the retention of the salines. With the improvement of the symptoms, increase the diet from proteid and fat to carbohydrates, and cut down the bromides. Water should not be given with meals, for one hour before nor for two hours after. Sufficient fluid must be given by the bowel as normal saline. The drop method, on account of its irritating features, has not proven of as much value to the writer as fixed doses at stated intervals. Rarely does this treatment fail in chronic cases. It is not, however, indicated in the acute and fulminant types. Icterus is a contraindication, if accompanied by severe clinical symptoms. Gastric lavage is rarely demanded in cases amenable to treatment. Rest, large doses of bromides, soda bicarbonate and glucose, and solid food at the right time will accomplish wonders. Purges frequently do more harm than good, although an initial dose of calomel in tenths is often demanded. As a rule the bowels can be well emptied by high colonic flushings.

When this treatment fails it usually can be demonstrated that directions have been ignored. Abortion is rarely necessary. The fulminant type of case, however, should be aborted without delay as soon as recognized, and even then it may be too late. The method of abortion is entitled to serious consideration, since infection is extremely apt to occur because of the low state of the patient's resistance. Removal of the ovum after dilating with Hegar sounds is the operation of choice in the early months. Frequently, however, the pregnancy is of four or more months' duration, when such methods may be impossible. The case should be carefully studied and treated as conservatively as possible. Vaginal hysterotomy is the method of choice in the latter months when the cervix is long and hard, yet its employment is often attended with considerable risk of infection. Especially serious is the risk of cystitis following catheterization, since bladder infections and pyelitis have been described as the focus responsible occasionally for the dreaded puerperal neuritis. The use of the rubber bag is frequently the best treatment even though its employment may not excite pains. Weights should be applied, and after twenty-four hours the cervix is usually softened sufficiently to allow the necessary dilatation. The blood-pressure is not high and commonly reads near 100,

although the pulse-pressure is frequently reduced. Consequently the cases are not suitable for bleeding.

The anesthetic is most important. Chloroform should never be used as it is certain to cause much added damage to the liver. Ether is objectionable as adding to the cause of nausea. Fortunately nitrous oxide and oxygen is in common usage and answers every demand. The writer wishes to take this opportunity for urging the "twilight anesthesia" with gas in desperate cases. The shock is minimum. This method has been much used in dentistry and is coming into employment in obstetrics and gynecology. Although consciousness is retained, there is little or no pain. The patient will answer questions during the operation, but she will not remember the details after return to bed. Yet with the employment of the treatment outlined above, therapeutic abortion will become a rare operation.

THE ROLE OF TUBERCULIN IN TUBERCULOSIS.

RAW, in the *Liverpool Medico-Chirurgical Journal* for July, 1914, says that whether or not a patient is going to be destroyed by tuberculosis seems to depend on two important factors: (1) virulence of infection; (2) individual resistance.

The variability in virulence of the tubercle bacillus is well recognized. In many cases, fortunately, the infection shows little tendency to progress in the body, so that the writer constantly sees in practice patients who have suffered from tuberculosis for twenty or thirty years. In other cases the infection is virulent and rapid, and kills the patient in two or three weeks.

In the former cases the bacilli are of low virulence; in the latter they are highly virulent, giving the body no chance to offer any resistance to the attack.

It is in the avirulent bacillary infections that tuberculin is of such great service, and the writer has found it of little or no value in acute virulent infections.

The whole object of the treatment by tuberculosis is to produce an immunity in the blood against infection by tubercle bacilli, and, what is even more important, to prevent the further spread of the bacillary infection in the tissues. Whether or not it is possible to ever produce a complete lifelong immunity against tuberculosis is a matter of doubt.

As a result of the writer's experience, he has found that the lesions in the body which are caused by the typhus humanus are benefited more quickly and certainly if a tuberculin prepared from the opposite strain—namely, bovine tuberculin—is used; and in all cases of pulmonary tuberculosis the writer now only uses bovine tuberculin. It is less toxic and does not so readily cause reaction, is more easily tolerated, and causes the bacilli to disappear from the sputum more quickly. For the lesions caused by the typus bovinus—namely, lymph glands, tuberculosis, peritonitis, lupus, tuberculous diseases of the bladder, bones and joints—the writer invariably uses Koch's old tuberculin prepared from human cultures.

The question of dosage is of vital importance, and the writer's routine practice is to administer a course of tuberculin in twelve weekly injections, then resting for a month, and if necessary repeating the maximum injection every week. His dosage is as follows, of either human or bovine tuberculin:

0.0001 mg.	0.001 mg.
0.0002 "	0.004 "
0.0004 "	0.006 "
0.0005 "	0.0075 "
0.0006 "	0.008 "
0.0008 "	0.01 "

A special watch must be kept on the temperature, pulse, and blood.

It is rare to observe a general reaction if the above dosage is carefully followed.

In a great many cases the tubercle bacilli disappear entirely from the sputum at the end of a course of injections, but, unfortunately, if the tuberculin is not persisted in they in many instances speedily return; so that in some cases of pulmonary tuberculosis the injections should be continued for an indefinite time.

Whilst tuberculin *per se* cannot be ex-

pected to heal cavities in the lung or replace damaged tissues, yet it undoubtedly has the power of preventing the spread of the tubercle to healthy parts by means of its immunizing effects. Time is thus given for repair of the affected tissues.

Raw would like to express the opinion, after treating over a thousand patients with injections of tuberculin, that it is a remedy of the greatest value, especially in early cases and where the deposit of tubercle is localized, as in one apex or in a lymph gland or single joint; but where the tuberculosis is disseminated and complicated by secondary infections, the use of tuberculin cannot be expected to be of much avail. It ought, however, to be tried in every case with the hope of some relief or possible benefit, as we cannot allow the patient to suffer and die without making every effort to arrest the progress of the disease.

Tuberculin is not going to revolutionize the treatment of tuberculosis. It is a valuable aid to the other methods of treatment, hence it must be used with care and discrimination and with a full knowledge of its dosage and therapeutic effects.

The writer concludes by saying that the best treatment he can offer to-day to a person infected with tuberculosis is a prolonged open-air life, preferably in a well-conducted sanatorium, excess of nutritious food, gentle exercise followed by plenty of rest, and a course of tuberculin by a careful physician.

COCAINE EATERS OF BOMBAY.

TUKE tells us in the *Indian Medical Gazette* for July, 1914, that the physique of cocaine eaters is invariably poor, they are feeble in body, often anemic, but seldom markedly so; their faces look puffy; their complexion is pale, but there is not, the writer thinks, any complexion peculiar to cocaine eaters. Their expression is that of persons who have passed many sleepless nights, heavy, dreary, and dull looking. Such as a rule they are when first seen in the prison. With deprivation of the drug their appearance becomes similar to others of their class.

Cocaine in India is always eaten with pan supary. Consequently the mouth, teeth, and the tongue are of the red color common to those who eat pan supary alone without the addition of cocaine, but there is a difference, and this difference will enable the observer to make a fairly accurate guess in combination with the dull facial expression that a person is a cocaine eater. The difference is this, that a cocaine eater has no regard for the cleanliness of his mouth and teeth. The teeth are stained a dark-reddish or nearly black color. They always are very dirty. They obviously never receive attention. Another point is that the dorsum of the tongue is coated with a dirty, dark-colored fur. The reason of this is perhaps that the cocaine eater never cleans his tongue, but a more potent reason is, the writer thinks, that owing to the anesthetic effect of cocaine on the mucous membrane of the tongue, the eater uses much more lime in his pan supary than he would if the membrane was more sensitive. The lime has a caustic effect and hence the thick, reddish-brown-colored fur. The tongue soon becomes as the tongue of other persons in prison, but the writer has seen the remains of the color nearly a month after deprivation of the drug.

Sex.—Few women eat the drug, but a good many seem to be connected with the retail trade. The writer has not heard of any young girls taking it.

Race and Caste.—Amongst the numbers many are Mahomedans. The lowest caste of Hindu do not seem to become cocaine eaters. The writer has met with no Parsis or native Christians who take it.

Of a total of 55 eaters, 33 were Mahomedans, 18 high caste Hindus, and 4 low caste Hindus.

Occupation.—Whatever the former occupation of those who eat the drug may have been before they acquired the habit, they mostly, if poor, join the ranks of thieves when they take it in any considerable quantity. Eating it renders them unfit

as a rule for hard and regular labor, and to obtain cocaine at its present price of annas six a pudi (about 2 grs.) they are forced to steal or to go without.

Age of Cocaine Eaters.—So far the writer has met with few boys who are addicted to the habit, but at the David Sassoon Reformatory the superintendent informed the writer that in his opinion nearly 50 per cent of the boys sent to the Reformatory have been cocaine eaters to a greater or less extent. He ascribes this in many cases to their being taught the habit by their parents' servants. Amongst several hundred children between the ages of nine and fourteen applying for certificates to work in the mills, the writer has only met with four children who had the typical expression and mouths of cocaine eaters. Another reason why boys become cocaine eaters is that older eaters often employ them to thieve for them and thus supply them with the money necessary for the drug. The writer has never met with any one much over the age of fifty-five years who has taken it regularly.

The Pleasures of Cocaine Eating.—The chief pleasure lies in the sensation produced in the mouth by eating pan supary and cocaine. Eaters say that their tongue and lips feel swollen and thick. There is also a smarting sensation in the tongue. When chewing, the writer is told, there is a marked objection to talking; the mouth becomes full of saliva and there is a pleasant sensation as if the mouth was full of butter, which spoken words would immediately dissipate. Some do not swallow the saliva and escape the internal effects of the cocaine.

There is a feeling of heat all over the body described as pleasant, and the person sweats. The hallucinations are agreeable; the eater imagines himself a rich man or maybe a nabob or a rajah. After eating the drug he walks along the road with eyes on the ground looking from side to side in the search of money or jewels. He picks up stones and other articles thinking them to be rupees or articles of value; these he may carry on his person till he recovers from his dose or is told that they are valueless. During this time he is afraid of being robbed and fears every one he meets in the streets; he is what is called "bhadak" (shy). This condition is of short duration, about half an hour as a rule.

Afterward he is restless and sleepless and may walk the streets continuously without feeling any fatigue.

The writer cannot discover that it is ever eaten for an aphrodisiac effect. Sexual desire is actually lost, and cocaine eaters are generally childless.

How the Habit is Acquired.—The habit is generally acquired from friends, but in the case of boys, as the writer has said, servants are sometimes responsible.

How the Cocaine is Obtained by the Eaters.—Cocaine is obtained from itinerant sellers in the streets. The eater having bought cocaine must then get his pan supary from elsewhere. It is now sold in the streets at the price of annas six a pudi, and less than this cannot be got, so several eaters will often combine together to buy a pudi between them, afterwards dividing it up. The retail seller proclaims his whereabouts to his clients by calling out "Loa, Loa," or "Pisa loa," but owing to the present police vigilance he is careful not to sell to any one he does not know.

Quantity Eaten.—The amount eaten varies daily according to the amount they can spend on it. From what the writer can gather 60 grs. a day is by no means an unusual quantity to eat.

Withdrawal of the drug, unlike opium-abstinence, does not create a painful craving. The writer has never seen any symptoms whatever following withdrawal, but he is told flatulence and constipation are common.

General Remarks.—Cocaine eaters are neither noisy nor violent; the opposite may be said for them. It renders a man a useless member of society, incapable of skilled or continuous labor, a thief and impotent. It does not, as does alcohol when taken in excess, render him a savage. The very

eaters themselves recognize the bonds that bind them and would, the writer is sure, welcome the day when it can no longer be obtained at any price, and this, it is to be hoped, will be the eventual result of the suppression of illicit importation.

EFFECT OF PITUITARY EXTRACT ON SECRETION OF MILK.

HILL and SIMPSON in the *American Journal of Physiology* for October, 1914, write a paper on this subject and conclude with the following summary of their views:

1. In a young, healthy, married woman, nursing her second baby, in the fifth month of lactation, injection of 1 Cc. of Parke, Davis & Co.'s pituitrin, equivalent to 20 mgm. of the dried infundibular portion of the gland, was followed, in ten minutes, by a marked increase in the amount of milk secreted.

2. After a latent period of from twenty to thirty seconds the mother could feel the milk "coming into the breasts," and a few minutes later abdominal pains were experienced, presumably due to increased intestinal peristalsis.

3. The milk withdrawn after injection was rich in fat, the average figure for the three experiments being 5.5 per cent as compared with 3.4 per cent for three days when no pituitrin was administered. In the milk yielded twenty-four hours after injection the fat content was still somewhat above the normal.

4. Although no quantitative estimations were made, judging from the mother's experience in nursing the child, it would appear that the quantity of milk obtainable by it on the morning after the injection was diminished.

THE CARE OF THE NEW-BORN BABY'S EYES.

F. PARK LEWIS in *The Nurse* for September, 1914, has an excellent article on this topic. As he well says, to open a baby's eyes is not always easy. The lids are small, and unless quite thoroughly dried they are slippery. The procedure is carried out as follows:

How to put drops in the baby's eyes. The lids should be held apart with the thumb and forefinger while a piece of absorbent gauze is placed below the eye to catch the overflow. The dropper is curved, the point being directed from the eye so that a sudden or unexpected movement would not injure the eyeball.

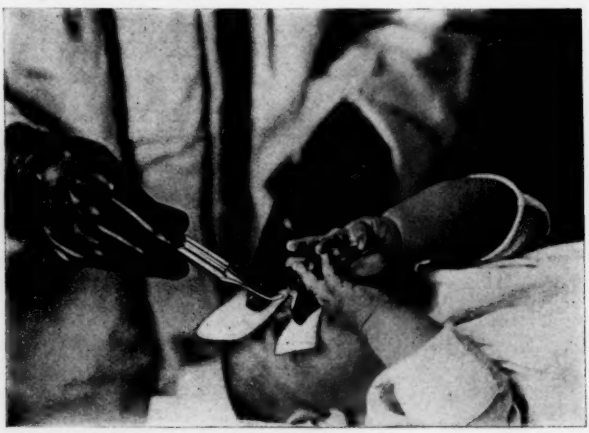
The infant, wrapped in his blanket with the face exposed, is laid upon his back in a pillow placed upon the nurse's knees. A piece of gauze is put upon the upper and lower lid; this to prevent the fingers from

slipping. The nurse will then open the lids while the doctor will drop in each eye the silver solution which has been already prepared. A slight redness may be produced, but if it is followed by no discharge this soon disappears and no ill consequence results.

Occasionally when an infection is present either because the drops have not been thoroughly used, or because the solution may have been old and have lost its efficiency, or possibly because the protective drops may have been omitted altogether, the infecting organism secures an entrance into the eyes and an inflammation promptly develops. It begins on the second, third, or fourth day if the infection occurs during the birth of the child. The infection may secure an entrance from the careless handling of the child by the mother or nurse at any time during the first few weeks. In this event it is called a secondary infection, but the course of the inflammation after it once begins is quite the same. The baby's eyes, which had been so bright and blue and clear, become suffused and watery. The discharge rapidly grows thicker, and with this the lids become sorer; soon they are dark and shiny and so swollen that they can with difficulty be opened.

When such a condition occurs it is only by the most unremitting care that the eyes can be saved. The lids must be opened and the irritating secretion washed thoroughly away at intervals of from fifteen minutes to a half-hour day and night. Great care must be exercised not to touch or scratch the eyeball with the pipette carrying the cleansing solution or the medicine which is to be dropped in. Such an injury would be likely to cause an ulcer of the cornea or clear part of the eyeball, increasing the danger thereby and causing a scar which would seriously affect the vision even if the eyes were ultimately saved.

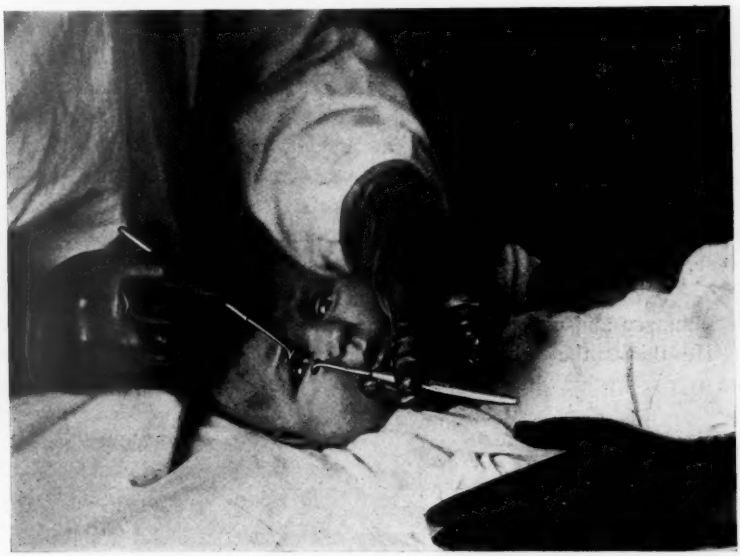
In managing such a case the nurse should wear large protecting glasses and rubber gloves, because the discharge from the child's eyes is infectious to even a higher degree in the eyes of an adult than in the eyes of a child. The yellow strings of pus must be washed away, a piece of absorbent cotton being held under the lids to catch the running fluid. A small paper bag should be on hand in which the pieces of used cotton can be put, and as they accumulate they should be burned. If the discharge is profuse it is well to have pieces of gauze put under the baby's head so that the pillows may not be infected or stained by the solutions of silver which are employed. The light of the room should not be too bright, as the eyes of the little one are more sensitive because of the inflammation which is present.



Irrigating the eyes. In irrigating the eyes of a child a piece of sterile gauze is placed above and below; a sterile towel will take the overflow.

If a solution of nitrate of silver is em-

ployed it should be kept in a dark or amber bottle as it deteriorates in the light, and it should always be corked in order that it may be kept clean and free from the air. All of the solutions, droppers, pledgets, pads, etc., that are used should be kept for the exclusive use of the child, and when no longer required they should be destroyed. The condition of the eyeball should be carefully investigated day by day, because under the closed lids mischief may happen. If, finally, after several weeks of unremitting care the eyes are saved, the immeasurable service which one has been able to render will abundantly pay one for the fatigue and the anxiety which have been endured.



Examining the eyes in ophthalmia neonatorum. When the lids are swollen, as occurs when they are inflamed, it is not always possible to separate them by means of the fingers alone; lid elevators are employed by which the eyeball is exposed and its condition determined. Note the rubber gloves worn by the physician and nurse; they also wear large glasses to prevent the spurting of infective matter into their eyes. An infection transmitted to an adult's eyes is so serious that the eyes are often lost. In treating the child's eyes, as shown in this photograph, the operator and nurse sit closely facing each other, with the infant's head held between the operator's thighs. The nurse, whose hand is shown at the right of the engraving, holds the infant quiet with its body and legs in her lap.

HYPNOTICS IN MENTAL DISEASES.

EAGER in the *Journal of Mental Science* for July, 1914, in writing on this subject first speaks of the class of case most often requiring hypnotics. In studying the records of over 350 consecutive male and female admissions to the Devon County Asylum, he found that the majority of cases demanding "sleeping draughts" during the first few weeks of admission were cases of maniacal excitement. The cases next most frequently requiring hypnotics were those of senile dementia. Eager considers that paraldehyde is the first drug to try in the former instance, provided that there is no contraindication in the physical condition of the patient. But if such contraindication exists the writer would resort to veronal in early cases, and sulphonal in cases with a history of long duration, after an examination of the patient's urine had proved the absence of renal disease.

In the later cases of senile dementia the writer has found sulphonal the best hypnotic, if given sufficiently early in the evening, in the more intractable forms of sleeplessness met with in this condition, but in the milder forms he has found hot drinks or stimulants produce a night's rest.

Where these drugs fail, the writer considers we have a valuable hypnotic to fall back upon in the form of luminal or luminal-sodium.

As to contraindications, Eager thinks

that paraldehyde should not be prescribed for patients with bronchitis or respiratory trouble, owing to the fact that the drug is an irritant to the bronchial mucous membrane. In old patients with emphysema, bronchitis is very readily set up by its administration. The writer has known bronchitis to follow its too prolonged continuous use in a girl of twenty-six years.

Most hypnotics, except morphine, are useless where pain is the cause of the sleeplessness. Luminal, however, is one exception, and there are some conflicting statements concerning the influence of chloral hydrate in this direction. The writer is of the opinion that if the pain is too severe to permit of sleep chloral fails to give relief.

Where sleeplessness occurs in a patient with nephritis, sulphonal and morphine are to be avoided. It is well also to avoid using morphine in patients suffering from heart disease, except under special circumstances.

Eager's summary and conclusion are as follows: He thinks the following table shows the relative value of the different hypnotics when taken by the mouth in the doses mentioned:

Hypnotics.	Dose.	Time taken by the drug to induce hypnotic action.	Hours of sleep resulting.	Cases in which the drug is recommended.	Cases in which the drug is to be avoided.
Paraldehyde.....	2 drachms.	½ hour.	5	Maniacal excitement.	Emphysema and bronchitis.
Amylene hydrate..	1 drachm.	1 hour.	5	Maniacal excitement.	
Luminal.....	10 grains.	1½ hours.	10	Where other hypnotics have failed to produce sleep.	
Veronal.....	10 grains.	¾ hour.	5	Early stage of maniacal excitement.	Renal disease, and where a habit is likely to be set up.
Adalin.....	15 grains.	1 hour.	6	Early cases of melancholia; also in sleeplessness associated with arteriosclerosis.	
Chloral.....	25 grains.	¾ hour.	6	Melancholia.	Heart disease.
Sulphonal.....	30 grains.	4 hours.	7½	Chronic excitement, and senile dementia.	Nephritis.

From the point of view of the alienists, hypnotics are to be considered very important drugs, but the enormous number at present in use, from which the writer has only made a selection of those he has found most useful, clearly shows that we have yet to seek a satisfactory and efficient drug. He considers that the use of hypnotics is to be avoided, if this is in any way possible, and that the removal of all probable causes that are preventing sleep is of the utmost importance in considerations as to their employment. In many cases the giving up or change of work, and adoption of some special treatment by those therapeutic measures suited to the case, will suffice to produce sleep and save a mental breakdown. Very few persons who are not of a neurotic temperament suffer from sleeplessness, and it is to be remembered that loss of sleep itself is one of the earliest signs of impending mental trouble in very many instances. The writer does not wish it to be concluded that he considers we can do without hypnotics, for, on the contrary, he prefers to use them rather than allow his patients to die from want of sleep and exhaustion. He believes that hypnotics when intelligently employed may avert the onset of mental trouble, but in cases in which they are resorted to it must be remembered that this is only part of the treatment. Efficient nursing must be an accompaniment to all hypnotics. There must be no noise. the bed must be properly made, the ventilation of the room attended to, and the light subdued. No patient should receive a nightly sleeping draught as a matter of routine. The dosage should be interrupted by making frequent trials to see how the

patient will sleep without the draught. In many senile cases it will be found that the sleeping draught can be dispensed with if a hot drink is administered, the face and hands washed, and the bed made comfortable. Attention to the bowels is of the utmost importance. In mental cases sleepless nights are not infrequently complained of when it is known that the patient has slept the whole night through. It is not wise, therefore, to trust too much to the patient's statements in these cases, but preferably to gather reliable information by careful observation.

In conclusion, the writer wishes to point out the growing evil caused by facilities which exist enabling the public to procure hypnotic preparations. It should not be possible for this to be done without the authority of a prescription from a duly qualified practitioner. Further, when prescriptions of a hypnotic preparation are handed to a patient the number of times it is to be repeated should be specified thereon by the prescriber, and each time the hypnotic is dispensed the chemist ought to sign and date the prescription. This course the writer advocates, remembering that hypnotics in a large number of persons are calculated to give rise to a craving for their continued use.

THE TREATMENT OF PLACENTA PREVIA.

DAVIS in the *Journal of the American Medical Association* of July 25, 1914, writes well upon this important topic.

Cases of placenta previa may be, for purposes of treatment, divided into those in which hospital facilities are promptly obtained and those which are treated outside of the hospital. In hospital cases, operations which the general practitioner cannot safely attempt may be undertaken with a fair chance of success. If ectopic pregnancy of the upper variety is of sufficient gravity to demand the services of a skilful operator, with hospital facilities if possible, ectopic gestation of the lower variety, or placenta previa, is equally grave.

Let us first consider those cases which come under the care of the general practitioner of medicine and which cannot be conveyed to the hospital.

Two important factors must be kept in mind under these circumstances:

1. Any vaginal hemorrhage in a pregnant woman is a symptom of danger and must not be neglected. Because hemorrhage from placenta previa is accompanied by no pain, it is frequently neglected by patients.

2. In dealing with these cases the danger of infection must be kept prominently in view. Vaginal examinations and manipulation must be made as frequently as possible, and the use of the tampon should be avoided.

Without minute classification, placenta previa may be divided into those cases in which the os is not entirely covered by placenta and in which the membrane can be reached, and those cases in which the membranes cannot be reached. In the hands of the general practitioner and in private houses, the best treatment in the first class of cases is to rupture the membranes as extensively as possible, when dilatation permits the maneuver. Tonic doses of strychnine are then given and the patient is allowed to deliver herself, or, at least, is made to force the presenting part down to the vulva before artificial delivery is undertaken. In this way hemorrhage and infection will be reduced to a minimum, and although the risk to the child is great the mother's safety should be first considered.

In complete placenta previa, in the hands of the general practitioner in a private house, the Braxton-Hicks method of bringing down the legs and breech of the child as a plug should give the mother the best chance. To accomplish this, anesthesia, partial or complete, may be required. The placenta must be perforated by one or two fingers, combined version performed, and the leg seized and drawn through the placenta. Only sufficient traction should be made to bring the breech firmly into the pelvic cavity and against the cervix and

placenta. Under no circumstances should forcible and immediate extraction be practiced. The life of the child should be disregarded in the interests of the mother. If a constant tension on the child is desired, a noose of bandage should be slipped about the child's ankle and a moderate weight attached. The mother may then be stimulated as required, care being taken to avoid the use of ergot and pituitary extract. Strychnine, atropine, and digitalin hypodermically, with salt solution injected into a vein or connective tissue, will be found especially useful. The mother demands constant observation until labor finally develops, and the fetus, if possible, is expelled spontaneously. In placenta previa the practitioner must expect and be forewarned against postpartum bleeding. The delivery of the child should be followed by the delivery of the placenta, irrigation of the uterus with a hot one-per-cent dilution of liquor cresolis compositus or normal salt solution, and firm packing of the uterus, cervix, and vagina with 10-per-cent iodoform gauze. If undue traction is avoided and spontaneous expulsion of the fetus secured, there will be no dangerous laceration of the cervix; but if undue violence had been employed the cervix may be severely torn, and severe or fatal hemorrhage may follow. Under these circumstances immediate suture of the cervix may be necessary.

In hospital practice, with the mother in good condition and the membranes available for rupture, the escape of the amniotic liquid may be followed by the introduction of a dilating bag through the rent in the membranes into the cavity of the amnion. This should be gradually distended to its fullest extent, securing dilatation of the cervix with pressure on the placenta. When dilatation is sufficiently advanced the child may be delivered by forceps, in many cases advantageously, with a minimum risk to the mother and with a great reduction in fetal mortality.

When the membranes are not available for rupture, and when the cervix is resisting, because in a primipara it is poorly developed, or in a multipara has been altered by scar tissue from previous confinement, mother and child will obtain the best result by prompt resort to abdominal Cæsarian section. If the child is premature or dying or dead, from long-continued maternal hemorrhage, the placenta may be perforated by the fingers and combined version practiced and the child's body used as a plug to check maternal bleeding. Spontaneous delivery and uterine contraction must be secured in the manner already described.

If the child be living and in good condition, the cervix soft and dilatable, and the head presenting, with the patient in hospital, the obstetrician may elect to pierce the placenta and insert a dilating bag through it within the cavity of the amnion. This bag may be distended with antiseptic fluid, hemorrhage checked by pressure, and gradual dilatation of the cervix thus secured. With good dilatation the use of the forceps will sometimes secure a living child. In hospital practice, however, where the child is fully viable, mother and child will obtain the best results by abdominal Cæsarian section. At full term in hospital cases, whether the child be living or dead, the mother will obtain her best chance for recovery by the same method. The writer's experience in abdominal Cæsarian section for placenta previa comprises seventeen cases. In these the membranes were not available and the placenta practically covered the entire internal os. In some of these patients the child was dead or dying and the mother exsanguinated. All were at or near term.

The method of operation consisted in opening the abdomen, turning out the uterus, incising it and immediately removing its contents. It was interesting to observe how completely hemorrhage ceased when the uterus was emptied. The uterine cavity was then thoroughly irrigated with hot sterile salt solution and packed firmly with 10-per-cent iodoform gauze carried through the cervix into the vagina. The

uterus and abdomen were closed in the usual manner. The vagina was sponged out with mercuric chloride solution and firmly tamponed with sterile or mercuric chloride gauze. During the operation the patient received intravenous saline transfusion, and strychnine, digitalin, and atropine were given hypodermically. In exsanguinated cases the patient was kept in the Trendelenburg posture until reaction occurred, and external heat, rectal injection of stimulants, and oxygen inhalation were used with success.

Of the seventeen patients three were especially exsanguinated through severe and repeated hemorrhages. All the mothers recovered. The maternal mortality was *nil;* the fetal mortality 40 per cent. There was no maternal morbidity except slow recovery incident to severe anemia. Infection did not develop.

THE X-RAY TREATMENT OF RINGWORM.

ORAM in the *Liverpool Medico-Chirurgical Journal* for July, 1914, tells us that a year ago an *x*-ray clinic was instituted by the Education Committee of the Liverpool Corporation, and during the past year 150 children have received treatment. Taking the period from August to December last year, during which period 42 children came for treatment, 35 of these were cured at the first exposure—*i.e.,* 85 per cent; and the average time which elapsed between the time of their first attendance and their being certified as free from ringworm and able to attend school, was just under four weeks. The other 15 per cent had to receive a second treatment, and the average time for these between their first attendance and their cure was twelve weeks.

One child developed an eczema of the scalp outside the area treated, and the writer thought it well to discontinue the treatment lest it should be held responsible. Otherwise all cases were cured within the three months' period. The writer knows that no other form of treatment can hold out promise of such speedy or certain results, and when in addition it is considered that the manipulation is carried out entirely by the medical man, and that in a period of about half an hour, and that the coöperation of the parents, which is frequently difficult to obtain amongst the very poor, is not an essential detail, one cannot fail to be impressed with the value of this method.

NOTES ON THE TREATMENT OF CHOLERA BY THE EXHIBITION OF CHLORHYDRATE OF EMETINE IN HYPODERMIC INJECTIONS.

The *Indian Medical Gazette* for July, 1914, contains an article by RENAULT upon this subject. He says that an epidemic of cholera of a very virulent type has just raged in the territory of Pondicherry, committing terrible havoc, as it has claimed no less than 1067 victims. It broke out in the beginning of October and subsided in the first week of April.

Twelve hundred and twenty-six cases came under the observation of the medical staff, specially organized to combat the scourge, and detailed for duty at different points of the infected area; but this figure cannot be regarded as exact, as a considerable number of cases must, it is to be feared, have been withheld from the cognizance of the officers on cholera duty, owing to the superstitious dread of the ignorant and affrighted population. But the death-roll certainly approximates to the truth.

The mortality was particularly severe in the months of December and January, at which epoch in the course of the pestilence the bill of health was appallingly bad.

It was at this stage, which appeared to the writer most opportune for experimentation, that he was led to put to the test the treatment by means of chlorhydrate of emetine.

Ever since the writer became aware of the discovery of Vedder in the Philippines and of Rogers in India, he has been conducting experiments himself with the remedy in cases of dysentery. The valuable experience thus acquired of its thera-

peutic action on the organism and its results determined him to make trial of it in cases of cholera. He employed it in hypodermic injections of 1-in-100 strength in the following doses: 4 centigrammes per diem in patients of more than twenty-five years of age; 3 centigrammes per diem in patients of the ages between fifteen and twenty-five; 2 centigrammes per diem in patients of the ages between eight and fifteen; 1 centigramme per diem in patients of the ages between one and eight.

These injections were repeated, and the doses were themselves enhanced according to the necessities of the individual case.

Sixty patients were subjected to this treatment; 44 were discharged cured, while 16 succumbed, thus yielding the not inconsiderable result of 73 per cent of cures.

As the notes published to date of researchers the world over about the application of emetine tend to show, this remedy is very potent in its action in dysentery, effecting not only a diminution of amebæ in the motions, but also the disappearance of the colic and the return to normal of the number and character of the stools.

Starting with this principle that the profuse diarrhea attendant on cholera, entailing, as it does, a rapid drain of the blood-serum, speedily prostrates the powers of the patient and leaves him neither time nor strength to react against the virus, the writer has been puzzling himself to ascertain if we have not in emetine the desideratum, the weapon in our therapeutic armory wherewith to arrest the intestinal flux and simultaneously restore the action of the liver.

The writer submits that his theory was entirely borne out by facts, and he describes below the results observed in the great majority of cases by himself, by the subordinate staff, and even by the infirmarians.

Very soon after the injection the number of motions diminishes, the bile reappears in the stools, which by degrees return to their normal consistency, sickness subsides, the action of the kidneys, which is sometimes suppressed, is restored, and little by little the patient rallies, and a complete cure is effected in a very short time.

It is to be noted that the remedy was applied not only by the writer and the health officer under him, but also by the infirmarians. These last in their misdirected zeal—which naively expected of the drug better results than it could possibly yield, before its success was demonstrated—exhibited it in desperate cases, contrary to the writer's clearly expressed directions on the subject. This circumstance has, the writer believes, to some extent vitiated the results, which ought to have been better than they turned out to be.

During the extreme stage of the disease, the stage characterized by marked loss of animal heat and anuria, when the vomiting and the motions have ceased, the drug has no effect whatever, the intoxication of the system being complete. But then the writer knows that all the other resources of medical science are equally unavailing. On the contrary, in the case of the patients still exhibiting the symptoms of vomiting and diarrhea, even if anuria has supervened, the administration of the drug has truly marvelous effects.

Without a doubt there are other modes of treatment which have produced as satisfactory results, notably the intravenous injection of either isotonic or hypertonic serum. But this calls for somewhat elaborate apparatus and assiduous supervision on the part of the medical staff. In very many cases the injections have to be repeated several times within twenty-four hours, and it is desirable that the practitioner be present at the bedside of the patient. In times of epidemic, then, when seizures are numerous and spread broadcast over a vast area, this mode of treatment must be pronounced to be well-nigh impracticable. Moreover, it can be averred as a general fact of all indigenous races, and the people of India are no exception to the rule, that they look upon these intravenous injections with peculiar disfavor, and stubbornly refuse to submit to them. They are much more easily persuaded to

undergo a hypodermic injection. From this point of view, therefore, the treatment by means of emetine is worthy of serious consideration by the faculty, as its administration is more easy and as it meets with less antagonism from the prejudices and susceptibilities of natives.

While injections of emetine are decided upon and resorted to, other auxiliary modes of treatment ought not to be neglected—*e.g.*, draughts to stop the diarrhea, and various injections of camphorated oil, of caffeine, and artificial serum. Recourse should likewise be had to external therapeutics, to injection with warm lotions, and other measures to mitigate the extreme coldness and numbness of the body.

THE THERAPEUSIS OF PERICARDITIS.

WILBUR in the *Journal of the American Medical Association* of July 25, 1914, reaches these conclusions:

1. The accessibility of the pericardium makes local treatment valuable and surgical treatment possible, and leads to the hope that further study may permit the application of remedies directly to the interior of the acutely or chronically inflamed sac. Induced pericarditis in animals offers a good field for study along this line.

2. Early diagnosis of dry or serofibrinous pericarditis permits of the most effective treatment and must be based largely on (*a*) vague feeling of oppression in the chest or actual pain, (*b*) cardiac irritability, and (*c*) friction rub.

3. Early aspiration, preferably to the left of the nipple-line, is of value in the diagnosis of pericardial effusion, and tapping should be practiced when the heart action is markedly disturbed from apparent increase in intrapericardial pressure.

4. The Brauer method should be more often used in patients with the evidences of pericarditis with adhesions and with early signs of cardiac hypertrophy or dilatation. It will often diminish disability and markedly prolong life.

5. Careful attention should be paid to the differentiation of pain in the region of the heart due to pericarditis (acute or chronic) from true angina pectoris, since the prognosis is necessarily so different. Careful and repeated examinations for a friction rub should be made over the whole cardiac area in patients with precordial pains.

TREATMENT OF HEART DISEASE BY MEANS OF PHYSICAL EXERCISES AND CO_2 BATHS.

The *Liverpool Medico-Chirurgical Journal* for July, 1914, contains an article by HARRIS on this topic. He thinks that exercise is indicated in cases in which there is a good reserve power of the heart and the muscles of the body are badly developed, as is often met with in young people. Here exercise will sometimes work wonders.

Secondly, it is indicated in fatty hearts, where it will often effect a permanent cure.

Thirdly, it is indicated in neurosis of the heart.

Fourthly, it is indicated in the convalescence from defective compensation in chronic valvular disease.

Finally, it is indicated in all cases of chronic valvular disease where the heart muscle is intact.

It will maintain a better compensation than digitalis would under the same conditions, without of course producing any of those bad effects which the prolonged use of this drug entails.

It is contraindicated:

1. In angina pectoris and aneurism.

2. In patients who have led a too strenuous life.

3. Soon after an acute attack of valvular disease and after rheumatic and other fevers.

4. Where the reserve power of the heart is small, and where there is a great deal of edema and difficulty in breathing.

In arteriosclerosis, so long as the disease has not progressed too far, the patient will do well under physical treatment; the heart will become stronger and the patient will be able to follow his daily occupation with

less effort than usual, and carefully graduated exercise will not increase the blood-pressure.

So far as the actual methods are concerned by which the treatment is to be carried out, only the following systems permit of a scientific graduation: The Oertel, the Schott, the Zander, and the Herz systems.

The Oertel system consists of gradually increased walking exercise, first on flat surfaces and afterwards on gently sloping hills. This method does not allow of careful graduation, and ought only to be recommended after the patient has carried out a successful course of treatment by means of the other methods.

The Schott system consists of a series of movements, active and passive, carried out on alternating muscle groups by means of manual manipulation. Here also perfect graduation is impossible to attain; for the manipulator, being a human being and not a machine, is unable to gauge always the exact graduation required.

The Zander and Herz systems are very similar to each other. They consist of a series of apparatus suitable for the manipulation of the different muscle groups. By means of levers and weights careful graduation can be obtained. The machine for active movement is of course worked by the patient himself, those for passive movements by means of a motor. The writer uses the Zander system, which he has fitted up at his premises, and can therefore only speak from personal experience of that system.

STUDIES ON THE VASOMOTOR CENTER: THE EFFECTS OF HEMORRHAGE AND REINJECTION OF BLOOD AND SALINE SOLUTION.

The *American Journal of Physiology* of August 1, 1914, contains an article by PILCHER and SOLLMANN on this topic. They conclude that:

1. Hemorrhage progressively stimulates, depresses, and paralyzes the vasomotor center.

2. The period of stimulation is somewhat variable, but usually persists during a total hemorrhage of about 25 Cc. per kilogram when the blood-pressure has fallen to about 90 to 100 mm.

3. A period of vasodilatation follows the stimulation; the perfusion flow may remain below the normal, return to the normal, or increase somewhat above the normal flow.

4. The center becomes paralyzed when about 35 to 40 Cc. per kilogram has been withdrawn and when the blood-pressure has reached a low level (approximately 30 mm.).

5. Reinjection of blood or saline solution before the onset of paralysis may restore the vasomotor tone.

6. The low blood-pressure (shock) level depends chiefly on the amount of blood lost and not to an important degree on the rapidity of the hemorrhage.

7. The relation of the fall of blood-pressure to the amount of blood lost varies in each animal; however the median type is approached more or less closely by each experiment.

THE ABUSE OF NORMAL SALT SOLUTION AND THE USE OF DEXTROSE.

LITCHFIELD in the *Journal of the American Medical Association* of July 25, 1914, makes these statements:

1. The administration of any artificial serum as routine postoperative practice is questionable therapeutics.

2. Too much water may fatally embarrass the heart.

3. Too much salt may fatally embarrass the kidneys.

4. When fluids cannot be taken by the mouth, thirst may be relieved by tap-water or by isotonic dextrose solution given by enteroclysis. The dextrose solution is preferable when there is danger of acidosis and in all cases of inanition.

5. When there is a distinct indication for an artificial addition to the amount of the circulating blood-serum, this may best be accomplished by the use of dextrose solution: isotonic (5.1 per cent) by enterocly-

sis; isotonic, hypertonic (up to 30 per cent), or hypotonic (2 per cent) by intravenous infusion.

6. There are no contraindications for the use of dextrose, but often serious contraindications for the use of saline solutions.

7. In all urgent cases the intravenous method is preferable.

8. Greater care should be exercised to see that all water used intravenously is not only sterile but also non-toxic.

9. In medical practice artificial serums should be more frequently employed: (1) Isotonic or hypotonic (*a*) after severe hemorrhage, exhaustive vomiting, or diarrhea; or (*b*) in cases of extreme inanition. (2) Hypertonic (*c*) in toxemic cases, including eclampsia and uremia; (*d*) in cases of oliguria with threatened uremia; (*e*) to combat acidosis; or (*f*) in toxic states, as after anesthetics, gas, morphine poisoning, etc.

10. Dr. Fischer's theory of nephritis is a gratuitous hypothesis, and his recommendations as to treatment are not justified either by established physiologic facts or by clinical experience.

TARSALGIA.

MERRILL (*Surgery, Gynecology and Obstetrics,* July, 1914) concludes a well-illustrated article on this topic as follows:

This condition is of static origin, generally combined with a systemic disturbance. The condition of static subluxation of the mediotarsal joint has for its principal factor a contraction and shortening of the posterior tibial muscle, and generally is associated with a depression of tone and power of the anterior tibial.

A fairly constant type of symptoms can be found. The condition usually exists without a frank inflammatory process present, and will yield to prolonged rest or palliative measures, or both.

A certain derangement of relationship of structures in the foot and leg, and perversions of function, will produce a definite type of pain in the tarsus, or tarsalgia.

BOOTS AND SHOES.

LITTLE (*Lancet,* June 20, 1914) writes interestingly from both the historical and practical standpoint, and quotes Sampson to the effect that supposing the body weight to be 150 pounds the strain on the ligaments, taking these as having their effect at a point one-sixth the distance from the summit of the arch to the ground, is equal to 230 pounds. As the arch yields and is flattened out, this strain increases enormously, until when the arch is almost touching the ground it would amount to 17,475 pounds, or nearly eight tons. It would be much easier, therefore, to hold up the arch when it is only beginning to give way than when marked flatfoot has developed and the arch has well-nigh disappeared. As a result of wearing the usual shoe the front part of the sole becomes bent upward, and if the sole be a stout one this curve becomes so fixed that the plantar flexors waste from disuse. One consequence of this is that the position of dorsiflexion at the metatarsophalangeal joints, which is temporarily normal in the action of walking when the heel leaves the ground, becomes a fixed one, and a rocking action, in which the bent sole is the rocker, takes place. The heads of the metatarsal bones, which are partially uncovered by the phalanges, have to undergo an undue pressure; hence corns in the sole of the foot and sometimes metatarsalgia, and in the case of the great toe chronic inflammation of the metatarsophalangeal joint and occasionally hallux rigidus.

Briefly stated the functions of a proper shoe should primarily be protection from cold, wet, and injury by external objects, and secondly support, when from any cause the foot alone is unequal to the strains to which it is liable. Obviously the ideal shoe or boot would be one that fulfilled these requirements, without impeding any of the normal functions of the foot. To come to particulars, the shoe should closely and tightly fit the heel and what the French call the neck of the foot, as far forward as the middle of the metatarsus; while it should

give plenty of room for free movement of the toes and for the normal spread of the foot when loaded with the body weight. It should above all fit easily across the bunion joint, and be what is called straight on the inner edge—that is to say, the fore part of the shoe should be adducted so as to bring the great toe into the line of the first metatarsal bone. And especially is this necessary in cases of flatfoot, for owing to the shape and position of the joints between the astragalus and scaphoid and os calcis respectively, adduction increases, while abduction decreases, the longitudinal arch. A further advantage of the adducted position of the fore part of the shoe is that it brings the great toe nearer to the middle line and under the center of gravity in the act of walking, and so puts the powerful plantar-flexor muscles in a more favorable position for maintaining the arch and propelling the body forward. The lower the heel the better—in the first place, because a heel by throwing the weight forward increases the strain on the arch, as Sampson has shown; and, secondly, because it increases the strain on the lateral ligaments of the ankle, especially the inner, which is less supported by the bones.

In flatfoot the heel and sole may be made continuous on the inner side, in order to prevent that breaking down of the waist of the boot which so often occurs, and also to throw the foot on to its outer border. In the same condition the inner border may be raised a quarter or even half an inch; this has a similar effect in a more marked degree.

In anterior metatarsalgia, and painful corns on the fore part of the foot whether from claw-foot or any other cause, a simple device will often entirely remove the pain and distress, from which some patients suffer acutely. The author refers to the insertion of a flat plate of metal between the welt and the sole, which has the effect of preventing extension of the toes, and generally limiting movement. Such plates are made of steel, or better of duralumin, which has the advantage of not corroding. If a thin layer of spongy india-rubber is put inside the boot the patient's comfort is still more promoted.

SPLENECTOMY FOR PERNICIOUS ANEMIA.

Coleman and Hartwell (*Medical Record,* June 27, 1914) report the case of a man twenty-seven years old, a plumber, presenting in 1911 a high-grade anemia which improved under iron and arsenic. Two years later because of asthenia he was compelled to enter the hospital again. His skin and sclera were lemon-yellow. There was extensive pigmentation of the lower half of the abdomen with many areas of leucoderma. His teeth were bad, and in addition the patient suffered from a severe type of pyorrhea alveolaris; the spleen extended three fingerbreadths below the free border of the ribs and presented a hard, sharp edge.

The blood picture on June 24 showed 1,600,000 red cells; Hb, 50 per cent; color index, 1.6; marked aniso- and poikilocytosis, slight polychromatophilia; 1 normoblast to 200 white cells; leucocytes, 3.5 per cent; lymphocytes, 32 per cent; large mononuclears, 3.5 per cent; eosinophiles, 0.5 per cent; mast cells, 1 per cent. A negative Wassermann. A pyorrhea alveolaris was brought under control with trichloracetic acid and with iodine. The patient was also transfused four times by the syringe-cannula method. The last transfusion was stopped after 100 Cc. had been administered because hemolysis was occurring. Two hours later the patient had a severe chill; the temperature rose to 103.8° F.; four hours later he passed two ounces of blood-stained urine; and at the expiration of five hours he was sweating profusely and suffering from dyspnea.

Whilst under treatment there was steady deterioration in the patient's condition and in the blood picture. After splenectomy recovery was prompt and he seemed temporarily better. At the time of reporting, six months after the operation, the red cells

are a million, hemoglobin 22 per cent; there is marked aniso- and poikilocytosis; polychromatophilia slight; 52 normoblasts and 3 megaloblasts to 200 white cells; leucocytes, 18,400.

THE PRESENT STATUS OF JOINT DISEASE AND THE BEST METHOD OF TREATMENT.

BECK (*Surgery, Gynecology and Obstetrics*, June, 1914) notes that the three types of joint affections we most commonly see are those of pyogenic, tubeculous, and syphilitic origin; further, the very chronic polyarthritic diseases, the etiology of which is not yet known. In the treatment of cold abscesses he advocates puncture with withdrawal of part of the contents, injecting with a modifying substance, such as Calot's mixture, formalin, or bismuth paste, etc. In the past six years he has used bismuth paste (10 parts bismuth subnitrate and 90 parts yellow vaselin).

As to heliotherapy, Rollier reports upon 1129 cases treated by sunlight in Leysin in a period of ten years from 1903 to 1913. Of these 1129 cases, 445 cases were of joints and 198 cases of spondylitis, which properly belong to joint disease.

Of 343 cases of closed tubercular joints, 311 were cured, 28 were improved, three were not improved, and one died. Mortality not one-third per cent.

Of 151 cases in which abscesses formed, 134 were cured, 10 were improved, five were not improved, two died. Total 1½ per cent mortality.

Of 149 cases with sinuses, 106 were cured, 24 were improved, eight were not improved, 11 died. Total 149; 7 per cent mortality.

Baish treated 80 cases of joint tuberculosis, five of which were operated and 18 still being treated, leaving 57 cases in which treatment with *x*-ray has been completed. Most of these cases were in the late stages, with sinuses. Thus with the *x*-ray treatment alone a cure of 30 cases out of 57 has been produced. In some of these cases, however, bismuth paste was employed.

As to purely surgical treatment, Garré reports on material covering a period of nineteen years, making a collection of 1000 cases from a number of clinics.

The great mortality which surgical treatment produced would discourage any one from bringing it into comparison with the conservative methods.

Beck's own cases consist of 650 cases of tubercular joints, at least three-fourths being in the latest stages in which abscesses or sinuses had formed. The average percentage of cures was 72, with a mortality of only 3 per cent, the remainder of the cases being either improved or unchanged.

Thus it is evident that the conservative methods of treatment are far preferable to the aggressive surgical procedures.

MASSIVE COLLAPSE OF THE LUNG.

PASTEUR (*British Journal of Surgery*, April, 1914) under this title indicates a total deflation, as opposed to lobular or patchy collapse of the lung tissue, of sudden onset in the absence of any signs of obstruction of the airway or of any known cause of compression due to failure of inspiratory power, and attended by definite physical signs and symptoms. To the surgeon this condition is interesting, since it not infrequently complicates abdominal operations or injuries of the trunk and throws some light on the nature of post-operative lung troubles. Massive collapse, Pasteur believes, is always determined by grave failure of inspiratory power. Keith's explanation of the mechanism of respiration is as follows: The upper set of ribs is seen to be raised by a bucket-handle movement, thus expanding the chest laterally. The lower set undergo no such movement; they are long levers articulated at their vertebral ends; when their ventral ends are raised they lead to a great lateral enlargement of the abdominal wall, but only to a very partial enlargement of the real pulmonary space. That is to say, while the upper set are direct lateral distenders of the lung, the lower are made accessory to the diaphragm. They provide a fulcrum

for the diaphragm; and their lateral movement is designed to make room for the abdominal viscera displaced by this structure, rather than cause a direct enlargement of the lung. The direct distender of the bases of the lungs is the diaphragm, which also exerts its influence with diminishing intensity as high as the apex of the lung.

It may therefore be stated in very general terms that the expansion of the lungs takes place under the influence of two forces, and that the overlapping between their respective spheres of action roughly corresponds to the position of the great fissure, the costal force acting mainly above and the diaphragmatic force mainly below it.

Paralysis of the diaphragm or other parts of the chest wall tends to induce loss of function in the subjacent lung, which is, other things being equal, proportionate to the degree of paralysis, and results in more or less collapse and edema of the pulmonary tissue. Experience has confirmed and extended this opinion.

The clinical signs of massive collapse following an operation are in the main identical with those presented by cases of diphtheritic paralysis of the diaphragm, and the importance of this resemblance is in part owing to the fact that in the latter group a knowledge of the accompanying pathological state of the lung is readily obtainable, whereas most cases of postoperative massive collapse terminate favorably. Massive collapse in respiratory paralysis may be explained as follows: As the expansion of the lungs at birth is primarily due to muscular effort, and is subsequently maintained by the balance between the forces which respectively cause expansion and contraction, it follows that whenever—whether as the result of paralysis or temporary inhibition—the distending force acting on any part of the lungs becomes less than that of the agencies which tend to cause it to contract, these latter take charge, with the result that the part of the lung concerned rapidly empties itself of its contained air. It is to be noted that the mechanism here suggested—active contraction—differs from that generally in explanation of lobular or patchy collapse, namely, gradual absorption of the contained air from a portion of lung which has been shut off, by occlusion of the airway, from communication with the external air.

Pasteur states that excluding one or two very rare accidents, it is safe to say that all postoperative lung complications have hitherto been classed under one of the following heads: Pneumonia, bronchopneumonia, parenchymatous pleurisy and pulmonary emphysema, and infarction. There are two points in relation to postoperative pneumonia which deserve notice: first, it nearly always occurs after operations on the abdominal cavity or in its immediate neighborhood; and secondly, the bases of the lungs are especially liable to be affected.

Infective material may reach the lung in two ways: either through the lymphatic or general circulation, as in cases of general sepsis, where the lung lesion is usually a widely disseminated bronchopneumonia; or by aspiration of mucus and buccal secretion into the lungs during anesthesia. It is noted that the practice of giving an injection of morphine and atropine before anesthetization has been followed by a striking disappearance of respiratory difficulty during anesthesia, and a corresponding diminution of postoperative bronchial complications after major operations.

An examination of many surgical cases shows that the so-called postoperative pneumonia is usually placed on the right base, which suggested that it might be a massive collapse. *X*-rays demonstrate the fact that a laparotomy markedly lessens the freedom of diaphragmatic excursion. The author believes that true lobar pneumonia is a rare sequel of operation and massive collapse a frequent one. He holds that when physical signs, especially at the right base, suggest pneumonia, the odds are in favor of massive collapse.

Although the onset is probably sudden in every case, there are two well-defined clinical types—acute and latent. There are two forms of the acute type; in one, which is rare, the initial dyspnea is of such inten-

sity and suddenness as to suggest pulmonary embolism or pneumothorax; in the other and commoner form the symptoms resemble sometimes those of acute pneumonia, occasionally those of heart failure, and more rarely still a combination of the two. In the latent type there may be a complete absence of symptoms, although the physical signs are generally well developed. Such cases may easily escape detection if the backs are not examined.

The physical signs commonly met with are dulness over the affected base, sometimes extending upward into the adjacent lobe; silence or tubular breathing over the dull area, usually without râles and with diminution or loss of vocal vibration in many cases; very imperfect movement of the affected side of the chest, which is nearly always reduced in girth, and vigorous compensatory action of the opposite side, with exaggerated breathing. Pain is often present for a short time at the outset; it is deep-seated, in the lower part of the chest, and less acute as a rule than the pleural pain of pneumonia. The occurrence of viscid expectoration is an early symptom in most cases. The sputum at first probably consists of mucus pressed out of the collapsing lobe; but if expectoration continues longer than thirty-six hours, there is probably bronchitis or bronchopneumonia in the reëxpanding lobe or in some other part of the lungs. The onset of collapse is nearly always accompanied by definite pyrexia, the temperature sometimes rising to 103°, or even higher. The reason of this is obscure, but pyrexia does not necessarily indicate the presence of inflammation in the lung. It is comparable to the rise of temperature met with in pulmonary infarction.

But by far the most important sign of massive collapse is the displacement of the heart's apex-beat toward the affected lung. It is probably the only sign peculiar to the condition, and is always present when the collapse is unilateral, and sufficient in degree. It cannot well occur when both bases are involved simultaneously, which explains why it has not been met with in diaphragmatic paralysis after diphtheria. The author has never met with a postoperative case in which the physical signs suggested that both bases were collapsed. The physical signs of this dislocation of the heart are generally obvious. In right-sided collapse the superficial cardiac dulness is obliterated and the apex-beat is carried inward toward, or even across, the median line. In left-sided collapse it is displaced outward into the left axilla.

The diagnosis of massive collapse cannot be made with certainty in the absence of this sign.

The mechanism of the displacement is probably as follows: When the affected lobe begins to contract, the contiguous costal and diaphragmatic surfaces fall in behind it, as far as anatomical relations will permit. Beyond this point the occurrence of negative pressure on the affected side of the chest can only be prevented by the displacement toward it of the mediastinum, with complementary enlargement of the healthy lung, of which there is always physical evidence. There is no evidence that postoperative protective limitation of diaphragmatic movement ever leads on to collapse, which, if due to that cause, would of necessity be bilateral. On the other hand we may conclude with certainty, from the evidence brought forward, that failure of respiratory force is the essential cause of massive collapse. We are therefore led to the conclusion that postoperative massive collapse is the result of reflex arrest of action of one-half of the diaphragm.

The afferent path of the reflex is along some branch of the vagus, for in all the cases within the writer's knowledge the initial disturbance, whether trauma, disease, or surgical interference, has always lain either within or in close contiguity to the area of distribution of some branch of this nerve.

Massive collapse usually occurs within two or three days of operation, and is relatively uncommon after the fourth day. In uncomplicated cases the symptoms usually

subside rapidly. Dyspnea rarely lasts more than a few hours, and by the end of twenty-four hours all urgent symptoms have generally cleared up. The displaced heart has already begun to move back toward its normal position, though this may not be fully regained for several days. Collapsed lung is unduly liable to inflammation; and where infective material is at hand, the clinical picture of massive collapse may insensibly give place to that of bronchopneumonia.

Among the most important diagnostic signs are the period of onset, generally within four days after operation, rarely later than the fifth; the absolute suddenness of onset in most cases, and the displacement of the heart toward the affected lung. The rapidity with which this takes place is remarkable; it is rarely absent at the time of the first examination. The compensatory overaction of the healthy lung sometimes gives the clue to what has happened: it is a confirmatory sign of much value, especially in acute cases.

The occurrence of cough, with free expectoration of greenish mucoid or mucopurulent material, is a very constant symptom, especially among adults. It makes its appearance within an hour or two of onset, too soon to be the result of inflammatory changes within the lung. In cases uncomplicated by bronchitis it usually begins to subside within ten or twelve hours, as reexpansion of the lung proceeds. If secondary inflammatory changes supervene cough continues and the character of the sputum may become modified. The expectoration in massive collapse is never blood-stained.

The diagnosis from pulmonary embolism —which may be closely simulated by the initial symptoms—rests mainly on the displacement of the heart and the absence of blood in the sputum.

Pneumothorax may be suggested, in right-sided collapse, by the hyper-resonance over the healthy lung associated with disappearance of the heart dulness. Here the true nature of the lesion will be revealed, on auscultation, by the presence of exaggerated breathing. Dingley and Elliott believe that the collapse is due to obstruction of the bronchioles of the affected lobe by the viscid secretion, with subsequent absorption of the retained air, and that it is not the result of the action of a deflating force.

An interesting tabulation of the records of 3559 laparotomies and renal operations performed at the Middlesex Hospital during the five years, 1906 to 1910, is appended to this paper. There were 201 lung complications, or 5.6 per cent. The highest percentage followed operations on the stomach, liver, and gall-bladder. Of these 201 cases 45 died, most of them from pneumonia. The lung complications were about twice as frequent for septic as for clean wounds. Most of those developing more than a week after operation were due to pleurisy, septic bronchopneumonia, pneumonia, empyema, and embolism. The highest percentage of lung complications followed the use of chloroform. During the year 1911-12, of 2000 cases there were 65 instances of postoperative lung trouble; rather over three per cent, as compared with 5.6 per cent in the earlier series. Of the 65 lung complications, 19 were cases of pneumonia—of which at most two may have been lobar—and 16 were examples of massive collapse. To these should be added two or three cases diagnosed as pulmonary embolism, which from the descriptions given and the absence of blood-stained sputa were in reality cases of collapse.

LOOSE BODIES IN THE KNEE.

WHITELOCK (*British Journal of Surgery*, Vol. I, No. 4) states that loose bodies in the knee, as in other joints, are formed as the result of diseased conditions or injury. Another classification which is sometimes utilized is that which concerns the minute structure of the bodies, so that they are grouped into fibrinous loose bodies, and bodies composed of organized connective tissue. The fibrinous loose bodies are nearly always incident to constitutional disease, with the single exception of certain

rare cases of traumatic nature, in which foreign bodies, such as the points of needles accidentally introduced into the joint, become enwrapped or ensheathed by concentric layers of coagulated fibrin. The true fibrinous bodies, differing from those in the exceptional cases just related, are formed either of homogeneous or concentrically laminated masses of fibrin, and may be of almost any shape; this together with the smooth, polished surfaces being due to friction and not peculiar to joints, but to be found in tendon sheaths and enlarged bursæ, whether these communicate directly with or are completely separated from a joint cavity. They are commonest in the small articulations. They may be found in arthritis deformans, Charcot's disease, and synovial tuberculosis, and when they are present there is almost invariably added chronic synovial effusion of varying quantity into the capsule. They are regarded as the result of fibrin-coagulation on the surface of a diseased synovial membrane; in some cases of tuberculous hydrops as the result of a fibrinous degeneration of the surface-layer of the synovial membrane. Clinically, they differ from other forms by never producing locking in the joint. They may be recognized by the crepitating sensation imparted to the examining hand or fingers as they move one upon another in the synovial effusion during the passive movements of the joint. Evacuation by means of an incision is the safest treatment.

Bodies composed of organized connective tissue are found as the result of disease as well as of trauma. In certain forms of chronic synovitis, supervening on one or other form of osteoarthritis, Charcot's arthroplasty, or repeated and intermittent traumatism, the synovial membrane becomes swollen, edematous, and thickened. As the result of chronic irritation the fibrous element may go on to cartilaginous or even bony formation, nor is this transformation surprising if it be recalled that the early development of the synovial membrane or of the articular or interarticular membranes of the joint is all from the same primitive undifferentiated embryonic intermediate layer of the axial blastema. In osteoarthritis and Charcot's disease, we may occasionally find fat instead of cartilage developing in the synovial fringes. The deposition of fat in the synovial membrane may be so great as to almost fill the joint and limit its movement considerably. This is recognized as lipoma arborescens. Treatment consists of removal, when it is necessary to relieve pain or restore movement.

Organized bodies as the result of injury may appear in the form of loose bodies either of fibrous tissue, hyaline cartilage, fat, or bone, developed as the result of chronic irritation of the synovial membrane. Loose bodies following upon contusions or lacerations of the synovial membrane, where the fibrous clot undergoes organization, may develop cartilage or bone and become pedunculated or even detached. Portions of the articular cartilage may become separated from the femur, patella, or tibia, as the result of a direct blow, or more rarely from a severe twist or strain, being detached with a ligament. Portions of one or other semilunar fibrocartilage may become detached completely or partially. Foreign bodies are at times found.

The commonest variety of loose bodies arising from chronic irritation of the synovial membrane is that which develops as the result of chronic trauma, in old-standing cases of torn and partially detached semilunar cartilages (menisci), especially in individuals over the age of thirty or of middle age, where there are repeated attacks of synovitis. It is by no means uncommon to find the synovial surface roughened and studded with minute papillated outgrowths so that the membrane in the earliest stages presents the appearance of rough velvet pile to the naked eye. If the mechanical irritation is continued, the synovial fringes become thickened and lobulated, and in the later stages certain portions (those most likely to be caught between the bones in flexion and extension of the joint) develop nodes of hyaline cartilage in their substance, become pedunculated, and as

they grow larger become continually freer until, with some violent and unexpected movement, one or more of them become detached.

The increased growth begins usually near the site of the original injury, but the process may eventually spread over the whole surface of the synovial membrane until the bodies number dozens or even hundreds. Once the condition is started, it seems to be progressive unless means are taken to prevent the chronic irritation of the synovial membrane.

The symptoms in these cases vary. In one the complaint may be of vague pains attributed to chronic rheumatism, or of occasional cracking of creaking in the joint, even during ordinary work, or in some simple movement, as in rising after resting. There may be impairment of function, such as inability to extend the leg rapidly or fully, or to flex it completely. In other cases, and perhaps in the largest number, a distinct account is given of some sudden and unexpected, even sickening, pain, experienced after a simple movement such as turning in bed; this leads to disability and locking, so that the limb cannot be completely straightened, though flexion is usually effective and painless. These symptoms are rapidly followed by swelling and other signs of overstretching and straining of the ligaments of the joint. The loose body may be disengaged, the locking may be as easily undone, and recovery takes place as after a sprain. For many years, at irregular and unexpected times, the individual may suffer similar attacks.

When such a joint is examined it is usually enlarged, often full of fluid, and may be tender in certain places, notably over the condylar attachments of the internal and external lateral ligaments (tibial and fibular collateral), and over all the attachments of the posterior ligament. The surgeon or the patient may be able to feel the body as it lies in one or other pocket of the membrane, on one or other side of the patella, in front of the collateral ligaments, or in the suprapatellar pouch. Not infrequently the patient has been able to satisfy himself of the presence of the stranger, and may be able to demonstrate its position and peculiarities, and to give an account as to whether it is moored at one point, or is subject when completely free to extensive and varied wanderings.

A skiagram is very helpful in deciding and localizing the presence of a loose body when it contains a bony deposit, although it gives no true estimate as to its size. As patients nearly always state or believe that the disability is due to an injury, it behooves the surgeon always to be on his guard lest he overlook a possible constitutional cause or complication.

Treatment consists in arthrotomy, with complete exploration of the synovial cavity, for it is by no means unlikely, unless all the pockets are examined in detail, that a body or bodies may escape detection and be left behind. Such an experience has befallen the writer in a case in which a torn semilunar cartilage had been removed, whilst a loose body was left undetected.

Loose bodies due to the detachment of portions of articular cartilage by direct violence, such as a blow, or indirectly from detachment with a ligament in severe sprains, is an important group, and the characters are remarkably constant. The bodies are usually solitary, as their etiology explains; they vary from the size of a horse-bean to that of a large almond, and are plano-convex or concavo-convex in shape, the convex aspect being perfectly smooth, while the plane or concave surface is uneven, roughened, or nodular. They may be free, or movable from side to side, or from one part of the joint to another, but not infrequently are fixed in a fossa or excavation in the articular surface of one or other femoral condyle; occasionally they are found in the intercondylar space in close relation to the cruciate ligaments, from which situation they may require dislodgment at the time of operation.

When carefully examined these bodies will be found to be covered for the most part with a thick, shining, white layer of

hyaline cartilage, whilst on the smaller plane or concave side there will often be noticed a thin plate or plaque of true spongy bone. For many years they have been described as single, and possess the peculiar concavo-convex or plano-convex shape.

It is alike interesting and important to note, in this reference, the tendency to the growth of hyaline cartilage over fractured and injured articular surfaces, as well as the fact, which is so plainly established by the histories of these cases, that the detached portions of articular cartilaginous surfaces, even when they are completely separated from all connections and are free, readily increase in size and grow. The fact is the more interesting as it is a new conception of our ideas of the growth of living tissues, nourished as the specimens must have been by imbibition or absorption, through their cartilaginous surfaces, of material from the synovial secretions. The growth of such a loose cartilage may be likened to that of the cell of a metastatic growth, which continues to grow in its new locality while adhering to the characters of its parent growth, though independent of it, and which is possibly incapable of reproducing itself.

THE ARTERIAL SUPPLY OF THE RECTUM AND PELVIC COLON.

DRUMMOND (*British Journal of Surgery*, April, 1914) in a communication upon this subject, of major importance to surgeons, illustrates both by pictures and descriptions the rectosigmoid anastomosis, and the anastomosis between the superior and middle hemorrhoidal arteries. The injection used was barium sulphate and almond oil pumped with a strong syringe into the inferior mesenteric artery, cut off at its origin from the aorta. It was found that if the left colic artery was not tied, the injection in most instances would travel up and fill the vessels given off by the superior mesenteric. When a ligature had been applied to the superior mesenteric artery at its origin from the aorta, it was possible to inject, through the inferior mesenteric, the whole of the large and small intestine area up to the duodenum.

Rubesch had already found that the injection of the whole could be brought about in the opposite direction by injecting through the superior mesenteric artery. This is an interesting anatomical fact, but clinically considered it seems unlikely that a collateral circulation could be provided quickly enough to prevent gangrene after ligation of the superior mesenteric artery.

The inferior mesenteric artery is given off from the abdominal aorta about 1½ to 2 inches from its lower end. According to Jamieson and Dobson, it arises from that vessel under cover of the duodenum. In carrying out these injections, the author frequently found in children, and occasionally in adults, where there was no ptosis of the duodenum, that the inferior mesenteric artery originated from the abdominal aorta half an inch, or sometimes one inch, below the lower border of the duodenum.

About an inch from its origin the trunk gives off the left colic artery, which divides into an ascending and a descending branch.

The point at which the artery divides into its two main branches is a variable one. The upper branch anastomoses with a branch from the middle colic, and the lower one anastomoses with the first of the sigmoid branches, sending a vessel upwards in addition, as a rule close to the bowel, to join its upper branch.

A large loop is therefore formed between the upper and lower branches of the left colic artery.

The sigmoid arteries from the inferior mesenteric supply the lowest part of the descending colon and the iliac and pelvic colons by a series of loops which anastomose above with the lower branch of the left colic, and below with the main trunk of the superior hemorrhoidal artery.

These sigmoid arteries are given off in an erratic manner. Of 20 cases injected, the first of the sigmoid branches was given off from the left colic, or a branch of it, 11 times; in the remainder of the cases,

nine in number, it sprang from the main trunk of the inferior mesenteric artery.

The remaining two or three branches arise from the main trunk of the inferior mesenteric artery, the arcades which they form anastomosing freely with each other. The lowest sigmoid branch does not form an anastomosis with the superior hemorrhoidal artery in this arcade fashion.

The superior hemorrhoidal artery forms no anastomosing arcade, but is, so to speak, a terminal artery.

The arterial anastomosis at this point, the rectosigmoidal junction, is of interest on account of the important bearing it has on operations devised to remove the lower colon and rectum.

Hartman found that, after operations by the sacral route upon carcinomata situated high up in the rectum, gangrene occasionally followed in the portion of the bowel which had been freed to permit of the establishment of a perineal or sacral anus.

De Dietrichs, one of many who have made post-mortem investigations on this point, showed that by ligature of the inferior mesenteric artery above the origin of the last sigmoid branch, the circulation of the rectum was not affected; but ligation of the artery (inferior mesenteric) below the last sigmoid branch arrested the circulation to the rectum, and gangrene in the living subject would be inevitable.

Hartman states that if the operator, after excision of the rectum, wishes to bring the bowel, with a satisfactory circulation maintained, down to the level of the skin of the perineum without traction, it is necessary to avoid cutting the superior hemorrhoidal arteries where they are necessarily divided when working exclusively from the perineum. A ligature must be placed high up on the common trunk of these arteries, above the last anastomotic loop, which is to be found a little lower than the level of the promontory of the sacrum. To do this the abdomen must be opened. Hartman himself was the first to open the abdomen and tie the superior hemorrhoidal artery to check hemorrhage and to allow of an easier mobilization of the rectum. Sudeck, however, was the first to point out the importance of an abdominal incision in order to find the exact position of this anastomosis, which he called the C. P. (critical point).

The superior hemorrhoidal artery divides —as a rule, at the upper end of the rectum or a little lower—into two main branches which spread out on the lateral aspects and front of the bowel. These two main trunks soon give off numerous small branches which form a free anastomosis around the ampulla of the rectum, and which can easily be traced down to the upper end of the anal canal. On reaching the middle of the ampulla the branches perforate the muscular coat and come to lie in relation to the inner coat of the bowel.

The anastomosis between the superior and middle hemorrhoidal arteries is shown to be a variable one. In only three out of twelve subjects could the middle hemorrhoidal artery be clearly shown. In all the specimens the tissue containing this artery was dissected off from the bowel, so that infection could easily make itself visible on the *x*-ray picture if it was of sufficient size. From these specimens we may conclude that in many cases the middle hemorrhoidal has not, as the text-books lead one to suppose, a free anastomosis with the superior hemorrhoidal artery.

In only two of the specimens could the inferior hemorrhoidal artery be seen—suggesting that this artery, like the middle hemorrhoidal, does not anastomose freely with the superior.

The anastomotic loop formed by the last sigmoid artery varies considerably in size and position, and in some cases may be absent.

Gangrene in the stump of the bowel brought down after high excision of the rectum by the sacral route may be due to (*a*) anatomical causes, or (*b*) tension sufficient to arrest the already handicapped circulation. It seems probable that tension is the more important of the two factors.

To insure that the inferior mesenteric artery is tied in a suitable situation—*i.e.*,

above the last sigmoid branch—it is necessary to open the abdomen. If the recto-sigmoid loop is small, any attempt to draw down the bowel to the perineum is likely to result in gangrene, and permanent colostomy should be done.

In the abdominoperineal operation for excision of the rectum, it is safe to ligature the inferior mesenteric artery immediately below the point where the left colic artery is given off when a permanent colostomy is made.

If the bowel above is to be brought down to the anus after excision of the rectum by the abdominoperineal method, the most convenient place to ligature the inferior mesenteric artery is immediately below the first sigmoid branch, which is to be recognized by the large anastomotic loop it usually forms with the branch of the left colic artery.

PAINFUL AFFECTIONS OF THE SHOULDER.

Under this heading BULKLEY (*Practitioner,* June, 1914) takes up in a rapid fashion certain well-recognized mechanical factors and notes that the most frequent cause of painful shoulder is inflammation of the subacromial bursa. It is interesting to note that Codman's work is quoted at length and his teachings in the main accepted.

ON ERRORS IN DIAGNOSIS IN CONNECTION WITH DISEASES OF THE ABDOMEN.

BLAND-SUTTON (*Clinical Journal,* March 4, 1914) feels strongly that if surgeons investigated their patients with the same thoroughness that physicians do, errors in the diagnosis of acute abdominal disease would be fewer. He notes that mistakes are often made not from ignorance, but from not taking the trouble to examine the patient. Operations upon the abdomen are attended at times with what may be truly called dramatic surprises; some of them are connected with conception under conditions when it is least expected. He records the case of a young married woman, ill for many weeks, with an abdominal tumor, with fever, and exhibiting a large circular orifice with sloughing margins in the situation of the navel, and a black, offensive mass protruding through it. This black mass was the buttocks of an extra-uterine fetus, which was successfully extracted and the placenta removed piecemeal.

The author himself was asked to operate on a married woman, aged twenty-four, and removed a full-grown extra-uterine child, which was free in the abdomen. He had no doubt as to the correctness of the diagnosis, for the child could be felt moving freely about the abdomen. The uterus was empty; a soft, dome-shaped mass occupied the hypogastrium, and a venous hum could be easily heard over it on auscultation. When the abdomen was opened, omentum, stained with meconium, appeared. Sutton grasped the fetus and gently lifted him out of the belly, but he vigorously clutched the omentum, and it was necessary to gently extend his fingers in order to release it. The mother recovered, but the boy survived but two hours. The mother gave a history of a thirteen months' pregnancy. At the end of nine months she came in labor, but the pains gradually passed away. She kept well until the awful attacks of pain began, these due, according to the doctor, to the child striking the mother in the region of the liver, stomach, and diaphragm.

Displacement of viscera is a fertile source of errors in diagnosis. Attention was called to the fact that in about 25 per cent of mankind the appendix is a pelvic organ; in such cases direct access to it, when inflamed or perforated, is obtained by means of a median subumbilical incision. Often it lies behind the ascending colon; in this position it is more easily reached by an opening in the ileocostal region. Sometimes it lies on the ascending colon and its tip comes into relation with the gall-bladder. A rare anomaly is non-descent of the cecum, which then retains its fetal position under the liver. The rarest of all displace-

ments happens when the small intestine, cecum and ascending colon are slung on a common mesentery. In this condition the cecum sometimes passes behind the mesentery, migrates into the left kidney pouch, and sets up intestinal obstruction of a very fatal kind. Wandering of the spleen leads to many doubtful diagnoses, and if enlarged it often descends into the pelvis and is mistaken for an ovarian cyst or a fibroid. This often leads to disaster, for when the splenic enlargement is due to leukemia and an operation is undertaken, the patient usually dies within twenty-four hours. If the case be enlargement not associated with leukemia, errors in diagnosis are of little importance, because the removal of such a spleen is invariably followed by good consequences. The caution of surgeons in regard to leukemic spleens is admirable. It took them a long time to learn that the removal of such spleens always ended in death. To-day any abdominal lump resembling a spleen suggests a blood count.

Under abnormal conditions almost any organ of the abdomen may reach the pelvis. A distended and dilated stomach occasionally reaches the pelvis, has been exposed and punctured for an ovarian cyst. It is important to know that the kidney is occasionally a pelvic organ, as Sutton states that he has personal knowledge of such kidneys—five in women and one in a man. It is impossible to recognize this anomaly until the kidney is exposed in its anomalous position, but the surgeon's suspicions should be aroused, for it lies behind the peritoneum. The use of an anesthetic is advised in the diagnosis of some abdominal swellings, and it is held that a swelling which disappears under an anesthetic rarely requires the aid of surgery, a case in point being that of a young woman who stated that she had accidentally swallowed a cork.

Finally, caution is given in regard to errors incident to the use of the *x*-ray, an instance being that of a woman with dermoid cyst, the teeth lying therein strongly suggesting ureteral calculi.

Sutton closes by saying that the Psalmist sings, "Put not your trust in princes." The surgeon learns that it is foolish to put too much trust in shadows.

CLINICAL AND EXPERIMENTAL RESULTS OF STREPTOCOCCIC INFECTIONS, WITH SPECIAL REFERENCE TO TREATMENT.

Dyas (*Surgery, Gynecology and Obstetrics,* June, 1914) notes that acute and chronic lesions of the joints, heart, and kidneys are frequently associated with streptococcic throat infections. Jackson has shown that the organisms through an embolic process in the minute synovial capillaries invade early the joint cavities directly. As to the methods of treating acute joint affections these may be classified as follows:

(*a*) Local. (1) Medical treatment. This includes rest of the affected joints, application of heat or cold, application of drugs or poultices, and bandaging. (2) Surgical treatment. This embraces immobilization of the part by casts or splints, Bier's hyperemia, aspiration of the fluid content of the joint cavity and injection of drugs, extension by weight and pulley, incision and drainage, and irrigation.

(*b*) General treatment consists in the administration of various drugs, sera, and vaccines.

Spitzer indorses the use of Bier's hyperemia, compression, and the use of hot air in the treatment of all forms of infectious arthritis whether polyarticular or monarticular. Inasmuch as drug and mechanical treatments are notoriously uncertain and the antistreptococcic serum is more often a failure than a success, he believes that the ultimate successful treatment will be by means of a polyvalent serum.

Mendel and numerous others have used subcutaneous injections in acute infective arthritis. Jackson used intra-articular injections of a solution of magnesium sulphate in acute arthritis without good results.

Porter has discontinued the use of intra-articular injections of formalin in olive oil

or iodoform emulsion in chronic joint infections, and reports good results with their use only when the arthritis is acute and confined to the synovial membrane. Murphy strongly indorses the use of two-per-cent formalin in glycerin in all forms of joint infections and extends the application to infections of the pleura.

This solution of formalin appears to cause no serious results even when injected intravenously in a quantity as high as 10 Cc. Three years ago the writer injected a series of dogs of various sizes intravenously with varying amounts of this solution and was never able to observe any harmful effects upon the animals.

Capps and Lewis found intrapleural injections of two-per-cent formalin in glycerin in dogs rapidly fatal when injected into an empyema which had been produced experimentally.

A laboratory study was made with rabbits, these being inoculated intravenously with a 24-hour culture of the streptococci suspended in salt solution. Simultaneously an intravenous injection of 1 gramme of a 25-per-cent aqueous solution of sodium salicylate was made. All the animals became rapidly emaciated and presented the appearance of severe acute intoxication, and although some of them lived as long as two weeks, all finally died of a streptococcic septicemia.

In each animal multiple suppurative arthritis developed in from twenty-four to seventy-two hours, depending upon the amount of streptococci injected, and this occurred regardless of whether attempts had been made to protect certain joints by injections of different solutions, or to protect the entire animal by intravenous injections of sodium salicylate.

Swelling and stiffness of the larger joints were noticed after twenty-four to forty-eight hours in all cases.

Post-mortem, thick, purulent material was found in the joints, which could be scraped away, leaving the synovial membrane dull and lusterless.

Destruction of articular surfaces of bones, ligaments, and cartilages may occur when the animals do not succumb too early to streptococcic septicemia.

Cultures from the heart's blood and from the pus joints in the animals used gave pure cultures of streptococci.

The greatest pathologic changes occurred in those joints in which attempts had been made to protect them by injections of formalin or iodoform.

Intravenous or intra-articular injections of sodium salicylate in solution as strong as 25 per cent have no permanent effect upon streptococcic arthritis.

Intra-articular injections of solutions of formalin in glycerin or iodoform emulsion do not protect the joints so treated.

Aspiration of the pus and injection of antiseptic solutions after infection of a joint had taken place did not give favorable results in the animals injected intravenously with streptococci.

THE MECHANICAL TREATMENT OF HIP DISEASE.

RIDLON (*Chicago Medical Recorder,* March, 1914) states that hip disease means any chronic condition of the hip-joint which is not to be differentiated from hip tuberculosis, and which if left untreated results in a more or less diminished range of motion at the joint, with usually some deformity and frequently shortening of the limb. Limitation of motion is at first due to involuntary muscular contraction; later to structural shortening of the muscles and ligaments; in most cases to change in the shape of the bones of the joints. These changes are as extensive in the acetabulum as in the femur. In some cases the extent of bone destruction is not commensurate with the extent of clinical symptoms. Every case of hip disease requires mechanical treatment for a longer or shorter time. Very few require operative treatment of any kind whatsoever. Little benefit can be had from medicine or laboratory products of any kind.

The treatment, then, of hip disease is

mechanical. This aims at correcting existing deformities and preventing the development of deformities in the course of disease so that the limb may be left in the best possible position for use; it aims to immobilize the joint more or less completely and for a longer or shorter time; to relieve sensitiveness and pain; and in the hope of preventing some destruction of bone it aims to relieve the diseased joint from carrying the weight of the patient in standing and walking; and finally it aims to make more or less continuous traction upon the limb for the sake of relieving the sensitiveness and pain, and possibly the destruction of bone due to interarticular pressure arising from the involuntary contraction of the muscles controlling motion at the joint.

As to Ridlon's methods, while the patient is waiting for the brace to be made, or in some cases while severe deformity is being corrected, traction is made by weight and pulley in the line of deformity. This is good treatment, but often not adequate. The Taylor long traction hip splint is the most efficient means of applying traction. Used with the patient in bed it gives fixed and continuous traction, and fixed traction is far more efficient in the treatment of hip disease than the elastic traction which is to be had by weight and pulley. Used as a walking brace the long traction hip splint gives intermittent and not continuous traction. It will not correct existing abduction or adduction deformity, nor will it prevent its development even when the patient is in bed, and when used as a walking splint it permits the development of flexion and adduction deformity to a crippling extent.

Dr. Shaffer's abduction device is therefore highly useful at times. The next type of splint for consideration is that for immobilization by leverage, namely, the Thomas hip splint, the simplest and the least expensive of all, provided it be properly used. In treating any case of hip disease with a splint the patient must be kept in bed while any existing deformity is being corrected, and it is best to keep the patient in bed as long as there is any pain or sensitiveness, or any tendency to the development of deformity.

It has been shown that many patients may not only walk on their diseased hips without harm, but at some stages of the disease with positive benefit.. Long before 1890 Thomas knew all the advantages, and most of the limitations, of what he called "damming" diseased joints, which since his time has been exploited as a cure-all under the title of "Bier's hyperemic method."

Since few surgeons have a sufficient development of mechanical sense to use any form of traction or leverage splint, plaster-of-Paris encasement has a large use. It has the advantage of fitting perfectly, of being entirely comfortable to the patient, is cheap, and may be applied by the unskilled. A long splint extending from the ankle to the nipples should always be used during the active stage of the disease while there is pain, tenderness, or tendency to deformity. During convalescence a short splint extending from the knee to the navel is enough. During the period of correction of deformity the patient should be kept in bed. So long as the joint is sensitive he should use crutches and an extended shoe on the foot of the well side, but when there is no longer pain, sensitiveness, and tendency to deformity the crutches and extended shoe may be put aside and the patient may walk on the diseased hip in most cases without harm, and with positive advantage in some cases. It appears that using these joints in walking stimulates them, adds to the percentage of abscesses, hastens the development of existing abscesses, adds considerably to the number of stiff joints, but on the whole shortens the period of the disease.

As to the operative treatment, whether excision of joints or the opening or even the aspirating of tuberculous abscesses, Ridlon holds that such treatment is almost never a benefit and almost always a positive harm. The same may be said of the use of tuberculin. Indeed he utterly condemns operations of all kinds, excepting as life-saving measures.

REVIEWS.

PRACTICAL HORMONE THERAPY. A Manual of Organotherapy for General Practitioners. By Henry R. Harrower, M.D. Paul B. Hoeber, New York, 1914.

The general practitioner (for whom this book is avowedly prepared) has long sought a sane book on treatment with ductless gland derivatives. To-day is a period of renewed interest in internal secretion, but overexploitation, speculation, and contradictions relative to treatment with such agents have left the general practitioner dazed in his opinions as to the usable and the non-usable. In such bewilderment many will turn to this new book. The very title of the book paves the way for the omission of the painstaking negative results obtained in the clinical employment of ductless gland derivatives. The scope of the book is limited to optimistic findings, and studies of negative character by very excellent workers, using similar preparations, within the same indications, in equally large series of cases, are continually kept in the background.

The author of this book anticipates and forestalls adverse criticism by his frank introduction. It is here that he discusses the difficulties of grouping the glands into subdivisions. While the difficulties pointed out are apparent, the classification used by the author cannot be justified except on the "standpoint of convenience" for the development of the book.

Apart from its overoptimism, the book will be found very acceptable and serviceable to the general practitioner. It will bring to him in accessible form such information as the use of pituitary preparations in obstetrics, in intestinal paresis, in shock; the use of adrenalin in asthma, in osteomalacia, in urticaria; the use of corpora lutea and ovarian preparations in ovarian deficiencies. Certain chapters are of interest because of the stimulating effect they will have toward further work. These chapters deal with the therapeutic application of such obtuse agents as the placenta, tonsils, lymph glands, brain substance, and liver. Other chapters contain valuable data as to pluriglandular therapy and preparations. The language throughout is pleasing and free from unnecessary technicalities. The reviewing and abstracting of literature is faithful to the original, but at times there seems to be a lack of discrimination as to relative values of publications. This book, unique in many respects, will solve many questions in organotherapy that confront the general practitioner. It will stimulate interest in this form of treatment. However, the rationality and practicability of this treatment so evident in this book are destined to many a defeat when put to test by the practitioner. M.

A MANUAL OF OBSTETRICS. By Edward P. Davis, A.M., M.D. W. B. Saunders Co., Philadelphia, 1914. Price $2.25.

Dr. Davis has during the last fifteen years prepared, we believe, no less than four books dealing with this important department of medical practice. All of these contributions to medical literature have been well written, and they show that he is not only familiar with the scientific aspect of the subject, but he writes as one who has had large experience as an obstetrical practitioner and teacher. The present volume contains 463 pages, of rather small size, and is very much more condensed than most of the modern works dealing with pregnancy and parturition. It may be considered to be obstetrics in a concentrated form, and it is one of the best examples of well-balanced concentration that we have seen. Avoiding the discussion of problems which are still undecided, it gives clear and scientific directions which are in accord with the views of a majority of obstetricians, and for this reason will be most useful to students and general practitioners.

The directions which are given as to the prevention of ophthalmia neonatorum are so simple that one cannot help thinking that at the moment the author must have been

writing for a nurse rather than for a physician, for the concluding paragraph reads that "when redness and swelling with a mucopurulent discharge appear in the eyes the physician should be at once notified." In the treatment of the toxemia of later pregnancy, or, in other words, in the treatment of eclampsia, we note with interest that he advises venesection to the amount of 8 to 20 ounces, followed by the injection of double this amount of warm normal salt solution. The stomach should be washed out with a saturated solution of bicarbonate of soda and from 2½ to 5 grains of calomel with soda left in the stomach. The colon should also be irrigated, and digitalin, with or without codeine, should be given hypodermically. We presume that it is not the intention of the writer that this should be done if the pressure is high, and in most if not all cases it is high. We wonder, too, whether the author means to state that the convulsions if excessively severe may be controlled by the inhalation of oxygen or a small quantity of ether well diluted with oxygen. We did not know that oxygen by itself would arrest convulsions. Seemingly nothing is said about the employment of vascular sedatives such as veratrum viride. If the toxemia manifests itself after delivery the author would suggest digitalin, codeine, or strychnine.

A Text-book on Pathology for Students of Medicine. By J. George Adami, M.A., M.D., F.R.S., and John McCrae, M.D., M.R.C.P. (Lond.) Second Edition, Revised, Enlarged and Illustrated. Lea & Febiger, Philadelphia, 1914. Price $5.00.

It will be recalled that some years ago Professor Adami published an exhaustive work upon the principles of pathology which filled two volumes. This work, however valuable it was, or is, to those who are special students of this subject, nevertheless was too exhaustive and bulky for ordinary purposes, and subsequently the first edition of the present work appeared and at once became popular with teachers and students of pathology. It is to be understood that when the word pathology is used in connection with this volume it is employed rather to designate abnormal physiology than to indicate that the work deals with morbid anatomy.

After an introductory chapter dealing with cells and tissues it takes up the causes of diseases, morbid and reactive types of infection, regressive tissue changes, and progressive tissue changes. All these are considered in Part I under General Pathology. In the second part of the book, under Special and Systemic Pathology, we find considered the disease processes which affect the cardiovascular system, the respiratory system, the nervous, digestive, urinary, reproductive and muscle and tegumentary systems. Finally there is a chapter which deals with monstrosities and abnormalities. All of the illustrations which the book contains are excellent from the standpoint of the writer and reader; from the standpoint of their printing and quality they might be better.

The Pharmacy Handbook. By F. W. Crossley-Holland, F.C.S. Oxford University Press, New York, 1914. Price $2.00.

We are told in the preface that the chief aim of this volume is to present in form for ready reference information upon matters which come within the purview of the practicing pharmacist. This publication does not deal with pharmaceutical art, nor does it include information which is obviously part of the knowledge of every pharmacist. On the contrary, it, in many respects, closely approaches the characteristics which obtain in books which are generally therapeutic in nature. Thus, for example, chapter one deals with the general therapeutic properties of standard drugs, some general considerations in therapeutics, the doses of medicines for children, and a glossary of terms relating to the therapeutics of drugs. The second chapter deals with newer therapeutic remedies and contains a list of the sources of supply. Chapter three is entitled "Alimentalia," and deals with the essentials of food, a comparative table of general foodstuffs, the composition of proprietary foods, and diet tables for abnormal conditions. The fourth

chapter is concerned with serums, vaccines, tuberculins, and phylacogens, and their various applications and uses. The book then continues to deal with hormone therapy, with anesthetics, with ionic medication, with balneology, hydrotherapy, and includes a list of medicinal mineral waters. There is then a chapter upon pharmaceutical bacteriology, and still another upon what the author calls Pharmaceutical Ethics, which deals with the relation of the pharmacist to the physician, to the patient, to his own client, and to his brother pharmacist. Finally there is a chapter which is devoted to giving descriptions of those books which are thought necessary for the pharmacist's laboratory or library. Dr. Mitchell Bruce's book upon Materia Medica and Therapeutics is said in error to be written by J. Bruce Mitchell.

This description will make it clear that the book bears a title which does not fairly describe its wide range of usefulness. The list of the newer therapeutic remedies is well worth the price of the volume, as it gives the analyses of a large list of proprietary foods. Physicians will also be interested to learn that diet lists for patients suffering from various diseases are included.

A Reference Handbook of the Medical Sciences. By Various Writers. Third Edition, Completely Revised and Rewritten. Edited by Thomas Lathrop Stedman. A.M., M.D. Complete in eight volumes. Vol. IV, EMB to HAY. William Wood & Co., New York, 1914. Price $7.00.

The first and second editions of this Reference Handbook were edited by Dr. Albert H. Buck, and many members of the profession are, of course, familiar with the volumes as he had them prepared. There can be, of course, no material change in the methods which are followed in the preparation of a work which is so enclycopedic as this one, for unlike many so-called cyclopedic books this one is really what its title indicates, in that it is as much an encyclopedia in regard to all things medical, and collaterally medical, as it is possible for any work to be. Furthermore, the text devoted to each subject is as exhaustive and complete as is necessary for its full consideration. One cannot help being filled with wonder at the enterprise and care which has been shown in the production of the text. We have looked through the present volume with the thought that we might find something left out, but have failed in our quest.

As we said in the review of an earlier volume belonging to this edition, the physician who possesses this noteworthy contribution to medical literature may feel that he has in the eight volumes a whole medical library, dealing too with the collateral sciences, and that the matters discussed are brought thoroughly up to date.

A Manual of Normal Histology and Organography. By Charles Hill, Ph.D., M.D. Third Edition, Revised and Illustrated. W. B. Saunders Co., Philadelphia, 1914. Price $2.25.

In the preparation of the third edition the author states that he has not only carefully revised each chapter and embodied the most advanced ideas in this particular science, but paid especial attention to the chapters dealing with heredity in sex, glands, blood, and lymph. New text has been introduced dealing with the stomach in ruminants and with the hoof of the horse. The opening of the book deals with the preparation of histological material and the consideration of the cell and with special cells, and then considers the hematopoietic system, the digestive system, the various glands of internal and external secretion, and the nervous system. It is designed as a book for medical students and doctors in the early part of their course and fulfils its mission admirably, although it does not pretend to be in any way exhaustive.

A Manual of Biological Therapeutics. Parke, Davis & Co., Detroit, Mich., 1914.

This small volume of 174 pages deals with the various forms of serum which are used therapeutically, and with bacterins, phylacogens, tuberculins, glandular extracts, toxins, cultures, and antigens; and, therefore, it is evident that it covers a very wide field in modern therapy. It is provided with a table of contents which is really an index,

and with another table of contents, or index, which is therapeutic in its nature. Taking it altogether the volume is one which every practicing physician will be glad to have, as it contains in brief and useful form facts which all medical men should know in regard to newer methods of combating disease. Without any attempt to go so deeply into this somewhat complex subject that the general practitioner will have difficulty in following the meaning of the writer, it gives a clear description of what is to be accomplished when antitoxins, tuberculins and similar substances are employed. So, too, no attempt is made to hide the fact that the book is published by the concern which prepares the various products which are discussed, many of which are used in all portions of the world and are recognized as standard remedies. We understand that any physician writing for this little volume to Parke, Davis & Co., Detroit, Mich., will receive a copy, and we advise our readers to obtain one before the demand exhausts the edition.

CHEMISTRY FOR NURSES. By Reuben Ottenburg, A.M., M.D. The Macmillan Company, New York, 1914. Price $1.00.

The author tells us in his preface that in his opinion the teaching of chemistry to nurses is a new thing, but, nevertheless, the development of medical science renders it essential. Whether our readers will see fit to agree with his opinion we think is doubtful. There are so many important, practical points to be learned and practiced by the competent nurse that there is little time during her hospital years or private nursing days which she can devote to chemistry, and even if she does devote such time, we do not see that there are many occasions when there will be any need for her to practice chemical procedures.

There are 14 chapters in the book, the first seven dealing with elementary chemistry and the remaining portions considering medical chemistry and physiological chemistry. Why the nurse should be taught the chemistry of the stomach contents and feces, and of the proteids and carbohydrates, we do not understand. If, however, those in charge of any training school believe that such a course is advisable, we think that they should carefully look over this book before deciding that it is wise to recommend any other.

A TEXT-BOOK OF GENERAL BACTERIOLOGY. By Edward O. Jordan, Ph.D. Illustrated. Fourth Edition, Thoroughly Revised. W. B. Saunders Co., Philadelphia, 1914. Price $3.00.

When a book dealing with so limited a portion of medical science as bacteriology reaches its fourth edition in the space of six years, and during that time is subjected to several reprintings, it is evident that it has proved its usefulness. This book is the outgrowth of lectures given to the students in the University of Chicago. It contains 36 chapters, and an appendix in which infectious diseases of unknown causation are included. These infectious diseases, according to the author, are Whooping-cough, Rocky Mountain Spotted Fever, and Mumps. Probably some of our readers will be surprised that the author has refused to accept the conclusions arrived at by various investigators in regard to the first two of these diseases. As may be imagined, the book somewhat overlaps other works which have to deal with the subject of immunity, but as a rule the author holds himself to his task and strictly develops the theme to which he has set himself. It is well printed with good space between the lines. It is easily studied, thoroughly illustrated, and a credit to American bacteriology.

INFECTION AND RESISTANCE. By Hans Zinsser, M.D. With a Chapter on Colloids and Colloidal Reaction by Stewart W. Young, Ph.D. The Macmillan Company, New York, 1914. Price $3.50.

The text of this work is devoted to the biological phenomena underlying the occurrence of infection and the recovery of the animal body from infectious diseases. Manifestly it deals, therefore, with the subject which is of great interest at the present time. The author is Professor of Bacteriology in the College of Physicians and Surgeons of the Columbia University, New

York, and the author of the chapter upon colloids is a Professor in the Department of Chemistry in the Leland Stanford, Jr., University. This chapter is of particular interest because so many analogies between serum reactions and those taking place between colloidal substances generally have been observed. The book contains 21 chapters. Opening with a discussion on infection and virulence, it proceeds to a consideration of bacterial poisons, various forms of immunity, acquired and preëxistent, toxins and antitoxins, bacteriolysis, complement fixation, agglutination, precipitins, and phagocytosis, a subject which covers four chapters. Three chapters are devoted to anaphylaxis. Almost every page contains one or more references to the literature upon which the text is based. The volume is one that is going to take a place immediately in all medical and scientific laboratories, in the libraries of the manufacturers of biological products, and on the book shelves of all physicians who wish to keep thoroughly abreast of the important subject with which it deals.

THE QUESTION OF ALCOHOL. By Edward H. Williams, M.D. The Goodhue Company, New York, 1914.

When one attempts to print a book of less than 121 duodecimo pages in large type, well spaced, with a hope that he will be able to cover this immense subject, he may be inspired with hope, but it will be a grave question if hope will enable him to accomplish his task. The chapters presented in this little volume have three of them already appeared in the *Medical Record* and in the *Survey*. The author recognizes the evils that have been accentuated by the temperance propaganda and suggests measures of reform, which he believes will prove useful. The fifth chapter of the book deals with the drug habits, temperance instruction in public schools and its result, liquor legislation, insanity, the liquor question in medicine, and it asks finally, What shall we do about it? Naturally, we turn to the last chapter to see what answer the author has to this important question. He believes that we should shield the adolescent; that we should have high license; that the laws should be strictly enforced in regard to the selling of liquor to minors; and that the revenue derived from high license should be utilized exclusively for the promotion of public utilities calculated to serve as counter-attractions to the saloon. The latter suggestion seems feasible and wise, and we hope that it may be considered in a thorough manner by those in authority.

THE INTENSIVE TREATMENT OF SYPHILIS AND LOCOMOTOR ATAXIA BY AACHEN METHODS. By Reginald Hayes, M.R.C.S. Bailliere, Tindall and Cox, London, 1914. Price 3s. 6d.

The object of this little book is not to prove that the newer methods of treating syphilis in its active or later stages are without value, but rather to emphasize the fact, now universally recognized, but at one time in danger of being forgotten, that the older methods of treatment are still advantageous and particularly so for use in conjunction with salvarsan. The author very properly insists upon the fact that the proper inunction of mercury is essential if real effects are to be obtained, and this may be considered the key-note of his contribution, since by this means, in addition to the use of proper baths, a patient can often be better mercurialized than by any other means.

PEDIATRICS. A Manual for Students and Practitioners. By Henry E. Tuley, M.D. Second Edition, Illustrated. Lea & Febiger, Philadelphia, 1914. Price $1.00.

It is not very long since we called attention to the first edition of Dr. Tuley's little book upon Pediatrics, which belongs to the so-called Medical Epitome Series. In the present edition the author has elaborated the chapters on the care and examination of the child, on infant feeding, Kernig's sign, and lumbar puncture, and added to the chapter on deformities and injuries to the new-born, intestinal parasites. All parts of the volume seem to have been carefully gone over. Questions are placed at the end of each chapter which the student may ask himself. In some instances only three or

four questions are given, in other instances fifteen or twenty are presented. The book does not claim to be a complete manual of pediatrics, but a means by which a student may "brush up" upon this special department of medicine.

URINARY DISEASES. By Stephen H. Blodgett, M.D. Whitcomb & Barrows, Boston, 1914.

This is a volume evidently intended both for the nurse and for the physician, as it is based upon lectures upon this subject delivered during the past few years before various training schools for nurses. It does not deal so much with urinary analyses as it does with the significance of urinary findings and the dietetic measures which should be instituted when abnormal conditions of the urine are found. One very considerable chapter is devoted to recipes for patients suffering from glycosuria, and in these chapters directions are given whereby saccharin may be used to sweeten foodstuffs. Many of these recipes are excellent. Some of them seem to be unusual for this type of patient, as, for example, blueberry pie, rice croquettes with jelly, and fried rice. In part three the starch and protein content of various foods are given in percentages, but we doubt whether many physicians, much less nurses, will get much of practical utility from this section.

THE PRACTITIONERS' VISITING LIST FOR 1915. Lea & Febiger, Philadelphia, 1914. Price $1.25; with thumb index $1.50.

The Practitioners' Visiting List is so well known to our readers that it only remains to call their attention to the fact that the publishers have "taken time by the forelock" and brought out the 1915 edition some weeks before the New Year. It will be recalled that the first 32 pages contain useful data for the practitioner and that the List appears in four styles: Weekly, dated, for 30 patients; monthly, undated, for 120 patients; perpetual, undated, for 30 patients weekly; and for 60 patients, undated, the latter issue being without preliminary data for those requiring specially large record books. The List is of a size that can be easily slipped into the coat pocket.

THE CARE OF THE SICK-ROOM. By Eldredge Gerry Cutler, M.D. Harvard University Press, 1914.

This is a tiny little volume of 54 pages presenting in a most concise and condensed manner the things which should be done by the nurse and the physician, with the object of making a sick-room as pleasant as possible, whereby the distress of illness may be mitigated and the recovery of health hastened.

PRACTICAL MEDICAL SERIES. Under the General Editorial Charge of Charles L. Mix, A.M., M.D., and Roger T. Vaughan, M.D. Volume VI, Sections I and II. General Medicine, Edited by Frank Billings, M.D., and J. H. Salisbury, M.D. The Year-Book Publishers, Chicago, 1914. Price $1.50.

As we have said before, any summarization of current literature which bears the name of Dr. Billings upon its title-page brings to our hands something which is well worthy of consideration. This is a volume of this series which deals with internal medicine and to some extent with therapeutics and largely with diagnosis. The editors have endeavored to pick out from current literature the articles which they have thought most worthy of attention.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures and Original Articles. Edited by Henry W. Cattell, A.M., M.D. Volume III, Series XXIV. The J. B. Lippincott Company, 1914.

In the five sections of this volume there are articles dealing with diagnosis and treatment, general medicine, electrotherapeutics, surgery, child welfare, and "medical problems." The most interesting of these contributions to our readers will probably be one by Dr. Goepp on Hypodermoclysis in the Treatment of Acute Infection; another, the Nature and Successful Treatment of Rheumatoid Arthritis, by Pemberton; and still another upon the Thyroid Gland with Special Reference to Goitre, by Sherrill. So, too, the concluding articles on Big Fees, by M. V. Ball, and The Waste in Medical Education, by J. H. Mackay, certainly deal with active topics. The trend of Dr. Ball's

article seems to be rather in opposition to large fees than to small ones. He does not think that the well-to-do should pay any more than those who are of very limited means. We heartily agree with Dr. Mackay's statement that in medical education there is a crying need of coördination and systematic blending in sequence of study.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

Medical news during the last month is extremely scarce, and is chiefly characterized by the cancelling of Old Students' dinners, which are usually held early in October. At this time of the year there are, in the ordinary course of events, no meetings of scientific societies, but as regards the future we understand that there will probably be fewer meetings of scientific societies than would otherwise have taken place. This appears to be a natural sequence of the political situation, not necessarily on account of the absence of members of the profession, although a certain number of civilian practitioners are detailed for duty both at the front and at certain institutions which have been taken over by the naval and military authorities; but the fundamental reason seems to be that everybody is unsettled and no one can concentrate on writing papers or preparing material to be shown at the various societies.

The preliminary meetings of the Council of the Royal Society of Medicine have not yet been held, so that no definite statement can be made in this respect, but there seems to be a general opinion that the number of meetings will not be as great as usual. Possibly this is not disadvantageous, as there certainly has been a tendency for more meetings to be held than the attendance at the meetings justifies.

The general situation in London seems to have settled down to practically its normal condition. There is not, at present, any apparent sign of distress, and unemployment is certainly not more than is usually the case. The builders' strike collapsed early in August and certain building operations have recommenced, principally those connected with government departments. On the other hand, private individuals show no inclination to venture on such undertakings, and I am informed that the fulfilment of many contracts has been cancelled or postponed. The building trade is therefore likely to be in a bad position when winter sets in, and even the renewed confidence which is spreading over the country is unlikely to revive to such an extent as to allow of fresh building operations being undertaken.

Early in August circulars were sent round from the College of Physicians indicating that there would be a scarcity in the supply of certain drugs, and especially of those falling under the group of synthetic compounds, most of which are made in Germany. From the accounts published of the inquiries made by the Board of Trade, it seems probable that under existing tariffs we are unable to produce these substances. The potassium salts also appear to be scarce, and I suppose the reason for this is that most of the potassium salts are obtained from Eastern Prussia, where potash salts are readily obtainable as a natural output.

There is one distinct innovation in London which protrudes itself very forcibly on the people. Every morning and evening one of the large airships sails round about London and hangs in the air over various points. This serves the purpose of guarding the city, and has another effect in accustoming people to the presence of air craft in the neighborhood. No doubt this has a good psychological effect and would tend to diminish any apprehension or alarm should the air craft of the enemy appear in

its place. In connection with this, we have to note that the authorities have diminished the light at night to a very considerable extent, so that in the main streets as well as in the side streets only one out of every five or six lamps is lighted at dusk. In some of the main streets, where the larger arc lamps are burning, they have been fitted with hoods. It is assumed that the object of this precaution is to diminish the amount of light which can be seen from above, and thus render the location of any building more difficult to air craft. In several main streets the central arc lamps are not lighted at all, the only lamps which are burning being those on the side pavement. With the same object in view, the water in St. James Park, in front of the Palace, has been drained away, thus removing a landmark which can be easily appreciated from above.

Most of the large hospitals have made arrangements to receive wounded from the front. Those who have come over are soldiers with very mild wounds or with sore feet or some other more or less trivial ailment, for which, in the ordinary course of events, they would not have been taken into hospital. After the recent wet weather we expect to have a large number of men suffering from "rheumatism" in its various forms, which has been contracted from the wet trenches. The military regulations require that the soldier who has been admitted into hospital shall remain there until he is fit to rejoin his unit. This therefore keeps the beds occupied for a considerable time, as the men have to be kept in for a much longer period than they would be under ordinary circumstances. King's College Hospital, part of which has been given over to the military as a Territorial Hospital, has had as many as five hundred patients in the military side. These have been mild cases and have not required long detention. Their ailments have been of every variety, from fractured base of the skull, kicks from horses in the thigh, down to suppurating corns. There have been a few cases of typhoid and some of rheumatism, while a number of men are very disgusted because they have become infected with pediculi. To my mind this is one of the chief reasons for forming the separate battalions such as "Old Public School Boys," as there is no such risk of their contracting verminous diseases as is the case when recruits are mixed indiscriminately.

His Majesty the King has been very energetic in visiting those institutions at which wounded soldiers are being treated, having visited the London Hospital, St. Thomas's Hospital, and King's College Hospital in London, as well as many others in the country.

A large number of men in their fifth year of study showed themselves very anxious to become qualified and to offer their services to the War Office. For their benefit special examinations were held by the examining bodies of the Colleges of Physicians and Surgeons and by the Society of Apothecaries. The standard required for passing at these examinations was not lowered for the occasion. As a result of this measure a number of men have qualified a month or six weeks earlier than they would have been able to do in the ordinary course of events. At the present time there is a dearth of young medical men owing to the fact that a large number who were territorial officers have been called up and mobilized. In many cases these gentlemen were unable to find any one to act as "locum tenens" for them. Their absence has been catered for by their fellow practitioners, but in some country places this has been extremely awkward owing to the distance between the houses of the neighboring medical men. It is almost certain that the War Office will not be able to employ all these young men who have recently qualified, and it is hoped that some of them by taking these temporary appointments will relieve the distress caused by the absence of those who have been called up. Many of these territorial officers are serving with their units in various parts of the country, but on the other hand a number of field ambulances have been sent abroad with detachments of territorials, notably to Malta and Egypt.